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REPORT

of the author

ON

MORBUS COXARIUS, OR HIP DISEASE.

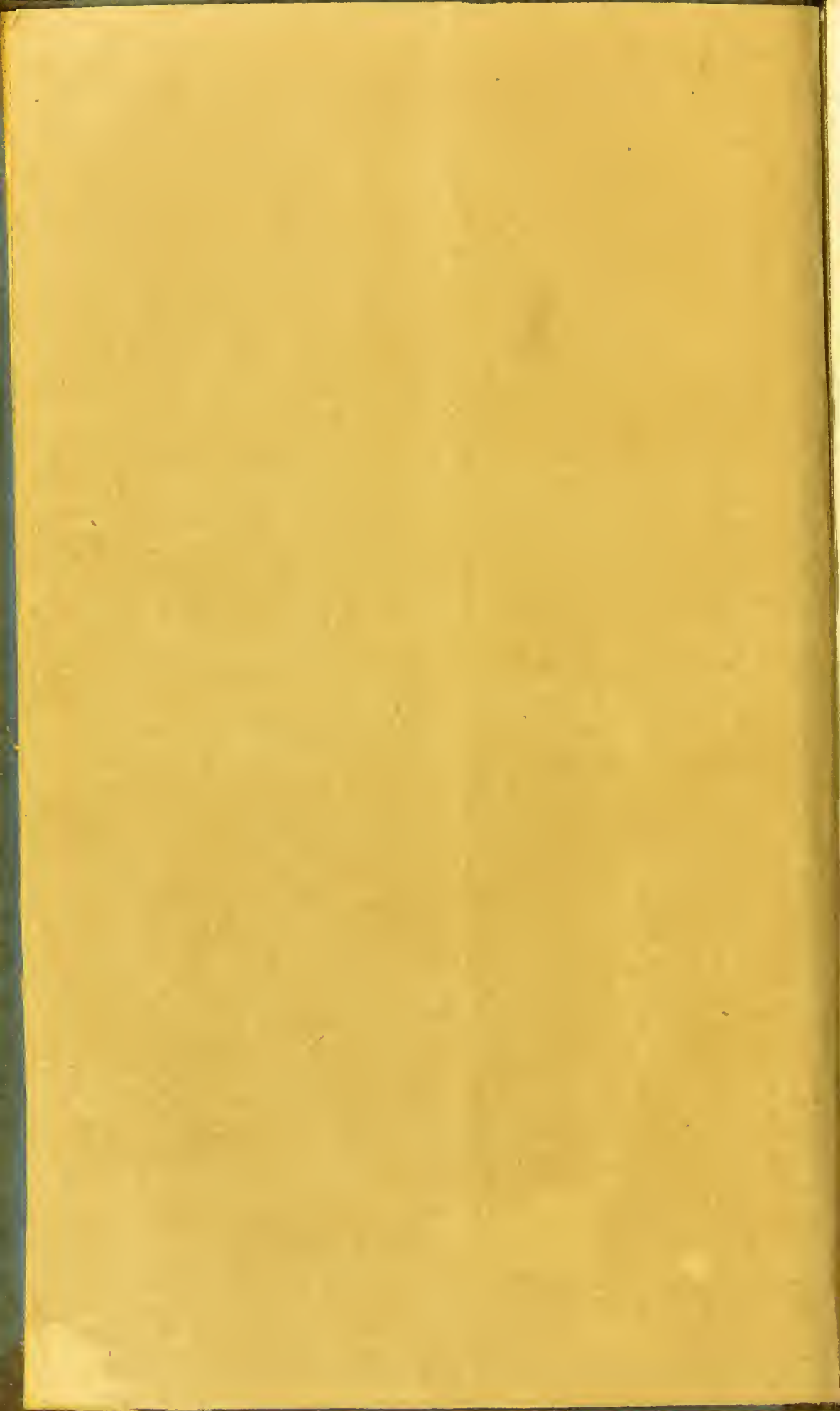
BY

LEWIS A. SAYRE, M.D.,

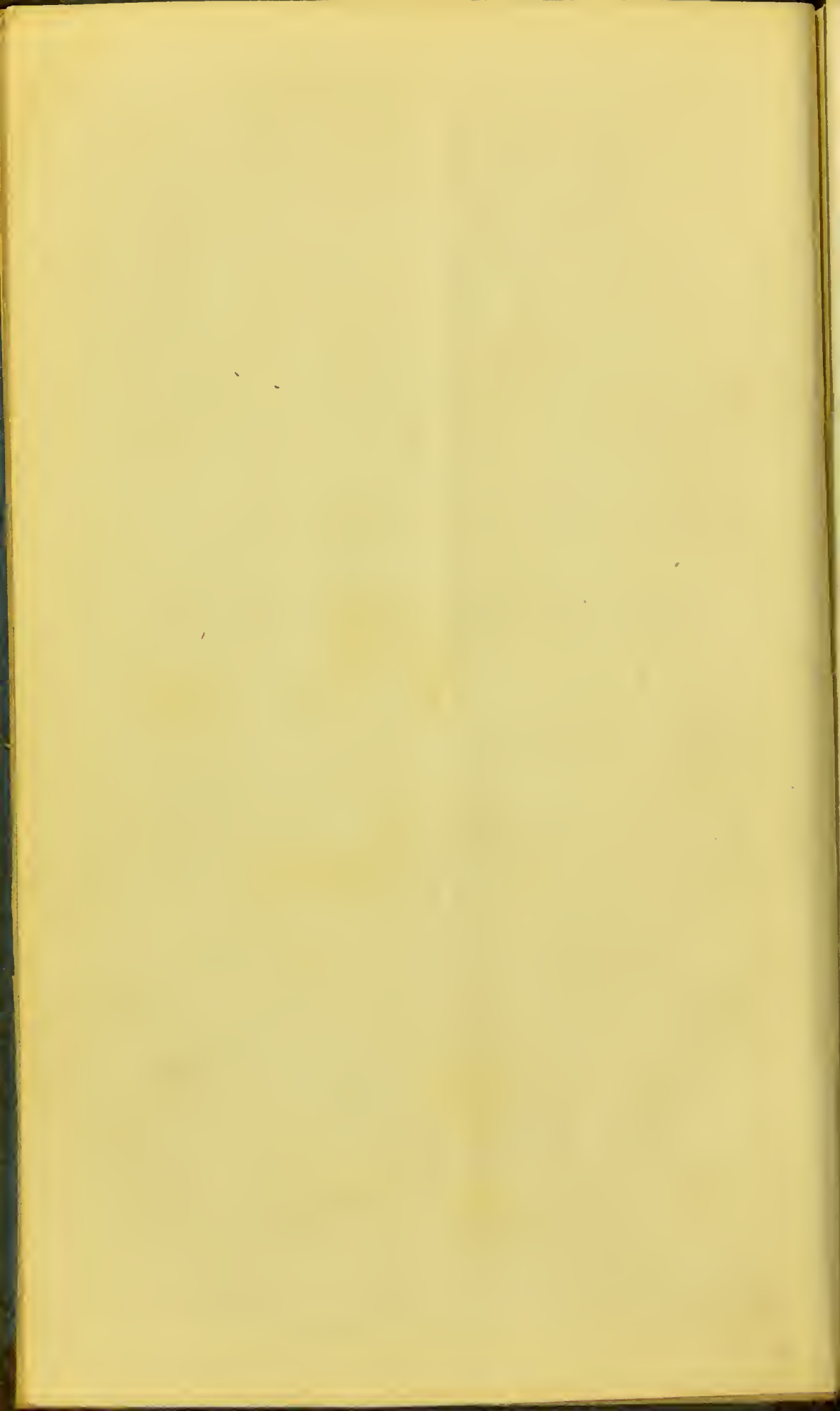
RESIDENT PHYSICIAN OF THE CITY OF NEW YORK, SURGEON TO BELLEVUE HOSPITAL,
ETC. ETC.

REPRINTED FROM THE
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1860.



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R E P O R T

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ERRATUM.

On p. 22, 17th line from top, under head of POSTERIOR SUPERIOR DISLOCATION,
THIRD STAGE OF MORBUS COXARIUS, *for* "Limb shortened and everted," *read* "Limb
shortened and inverted."

MORBUS COXARIUS, OR HIP DISEASE.

BEFORE entering upon the consideration of the symptoms and morbid changes of structure in this disease, it will be necessary for me to give a brief description of the most important anatomical structures entering into the composition of the hip-joint, in order that there may be a proper appreciation of the pathological views entertained in this report, and that the reader may fully comprehend the principles which I shall endeavor to establish, as the proper basis for correct treatment.

The osseous structure of the hip-joint is made up of the *os innominatum* and head of the *os femoris*, the latter being received into a deep cavity of the former, the *acetabulum*, by a kind of articulation called *enarthrosis*, or ball and socket joint.

The head of the femur, and the acetabulum, are cancellous in structure; quite vascular, and subject to inflammation.

The acetabulum is lined with cartilage at all parts, except at a circular pit (*fundus acetabuli*) which occupies the lower part of the cavity near the notch, and is cushioned with fat. The head of the femur, which fits to, and articulates with the acetabulum, is nearly two-thirds of the segment of a sphere, and is entirely covered with cartilage, except at the deep pit, which is for the insertion of the *ligamentum teres* at its upper and inner face looking towards the cavity of the pelvis.

The proper ligaments of the hip-joint are the *capsular*, the *ilio-femoral*, the *ligamentum teres*, the *cotyloid*, and the *transverse*.

The *Capsular Ligament* (A, Fig. 1) is the largest and strongest capsule in the body. It is attached above to the outer border of the acetabulum and outer face of the cotyloid ligament; and below, to the anterior inter-trochanteric line, and neck of the femur, which latter it completely surrounds. It is thicker and longer in front than behind, and is more extensively attached at its upper part,

where strength and security are required. The strength of the capsular ligament is further greatly increased by the *ilio-femoral ligament* (*B*, Fig. 1) which is accessory to it, and extends from the anterior inferior spinous process of the ilium to the anterior inter-trochanteric line.

Fig. 1.

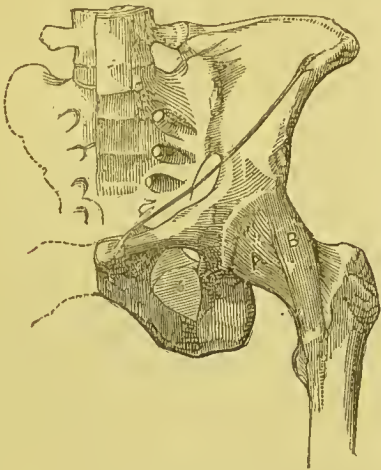
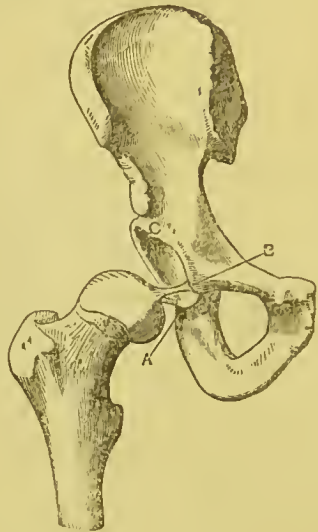


Fig. 2.



The *Cotyloid Ligament* (*C*, Fig. 2) is a thick prismatic ring of fibro-cartilage, mounting and attached to the brim of the acetabulum by which the cavity is deepened.

The *Ligamentum Teres* (*A B*, Fig. 2) is attached by a round apex to a pit just below the middle of the head of the femur; it divides into two fasciculi, which are inserted into the corners of the notch of the acetabulum *A B* and the cotyloid ligament, and is covered by synovial membrane.

The *Transverse Ligament* is continuous with the cotyloid, extending from one point of the notch to the other, and completing the circle of the cotyloid ligament, thus converting the notch of the acetabulum into a foramen, through which the bloodvessels enter to supply the interior of the joint.

The synovial membrane is quite extensive, lining the capsular ligament, the free surface of the cotyloid, the ligamentum teres, and the cartilage of the head of the bone.

All the authors to whom I have referred, describe two forms of morbus coxarius or hip disease, one in which the inflammation commences in the cartilage; and the other where the cancellous

structure of the bone is the primary seat of the affection, this latter variety being generally considered to be a genuine tubercular degeneration.

Every one seems to have overlooked the fact that this joint has an extensive synovial surface, which is as liable to inflammation as that of any other joint. Now I am satisfied that many of the cases commence as a pure synovitis, and should be treated on the same general principles as a synovitis of any other joint.

CAUSES.

These are as various as those of inflammation of any other joint; such as falls, blows, injuries, jumping from a height, over-exercise in running, jumping, skating, &c.; sitting down on a cold stone or damp place while overheated;¹ or any other extraneous accident which may induce an inflammation of the hip-joint. If this inflammation should occur in a strumous constitution, it will go on, unless arrested, until the cartilage and bone are involved, only to terminate in death, or in deformity, ankylosis and shortening, which are peculiar to coxalgia.

Almost all surgical authorities agree that morbus coxarius is inevitably the result of a contaminated constitution, and especially of a vitiated nutrition. In other words, that it is essentially strumous in its origin and character. This view has descended from teacher to the taught, has been so often repeated and inculcated, that nobody considered it worth his while to question its truth, or to investigate the fact, taking for granted that an assertion so positively made and universally accepted must be based upon mature investigation, and rest upon a solid foundation.

This has been the universal opinion for the last seventy-five years, and still prevails among the majority of surgical practitioners. Every day brings us clinical reports and clinical lectures of eminent surgeons in which the same doctrine is inculcated.

The *strumous* origin of morbus coxarius is the drift of all we hear and read about its etiology. Pre-occupied with this instruc-

¹ Key says: "The hip-joint is less frequently the subject of acute inflammation, probably from being well protected from the influence of atmospheric changes, to which the knee and almost all other joints are exposed. In the adult, acute disease of this joint is occasionally seen, in which the whole structure of the joint, cartilage as well as ligament, undergoes complete disorganization in the space of a few weeks."—(p. 230.)

tion, the young practitioner, in approaching the bed of his patient, can never fail to construe the emaciated and anæmic condition of the little sufferer into that of strumous disease. Thus age and authority have rendered this doctrine a sort of surgical gospel, rebellion against which is considered but the heresy of blasphemy and ignorance.

It seems to be ignored that medical science is essentially an inductive science, devoted to the investigation of natural truth, and facts appertaining to the healthy and morbid life of the human race; that therefore neither the age of a dogma, or the individual eminence of men, can be admitted as affording that indisputable authority in point of proof which is due only to "stubborn facts," that can be demonstrated to our own senses and perceptions. Whilst, therefore, I revere the scientific labors of our ancestors for the advancement of scientific truth, I must be permitted to question what is questionable, and to doubt what is doubtful. I must own in truth that I had accepted the same opinion, that they guided my first professional attempts in the treatment of this disease; but I also must here state that they never satisfied my mind as to their correctness.

Most practitioners will admit with me that they never succeeded in curing hip-disease by an antiscrofulous mode of treatment. To be sure the term *scrofulous* has essentially changed in its application within the past few years, and so has the treatment. Formerly, antimonials, the mercurials, and the iodine preparations, and bark were in vogue—to day, air, exercise, and generous diet are the chief remedies against this disease—but neither has cured *morbus coxarius*. Then derivatives were introduced extensively in order to eradicate the dyscrasic poison. The results have been equally unsatisfactory. In fact whatever remedies were resorted to, *morbus coxarius* was never relieved thereby. It took its course to a spontaneous cure, or else to a fatal termination.

Not until more attention had been paid to the *local treatment* of the disease have we had any satisfactory results. This fact alone should indicate the errors as to the nature of the disease formerly entertained. For it could hardly be asserted that a constitutional disease could be effectually relieved by merely local treatment.

Since this fact became clearly established in my mind, I have been investigating my cases of this disease more closely with reference to its immediate causes. With comparatively a very few exceptions, I have been enabled to trace the disordered action to direct trau-

matic influences. Most of my patients were healthy, some of them even of a robust constitution previous to the commencement of their attacks, and their constitution gave way only when their sufferings became so intense as to deprive them of their nightly rest and appetite, and to render them incapable of enjoying their accustomed out-door exercise.

Those surgeons who have had opportunity of clinically observing and studying hip-disease in numerous cases, will bear me witness that the sufferings accompanying this disease are truly fearful; so intense and prolonged as to reduce the strongest and healthiest frame to a mere skeleton in a very few months.

And, again, experience teaches, that no disease is capable of inflicting greater constitutional disturbance than affections of the bones or joints. Often have I seen phthisis of the lungs super-added to such cases in previously healthy subjects, &c.

It seems, therefore, that the inevitable effects of the disease have been mistaken for its causes, that the attenuation of the patient, his anæmia, his vitiated nutrition in all respects, have been construed into previously existing scrofulous cachexia, originating and characterizing the disease; whereas, they were consecutively developed by it, and were therefore results and not causes of the disease.

My own clinical observations of these facts stand by no means isolated. The same have been made by other surgeons, both in Europe and in this country. Among others Dr. Bauer, of Brooklyn, whose careful investigations are known to the profession in reference to this subject, has carefully recorded the causes and origin of 143 cases of hip disease, the result of which he has communicated to me as follows: "131 cases were clearly traced to traumatic injuries, mostly applied directly to the hip-joint itself. A large majority of these cases were previously of robust and healthy constitutions. In 9 cases the causes remained doubtful, and in 3 only the disease seemed to have originated by strictly constitutional causes."

It requires generally a very close examination to find out these causes, since the disease does not usually immediately follow the injury; but often commences or manifests itself weeks and even months after the accident, so that the patient and his friends naturally forget the accident and its connection with the disease, until specially reminded of it in the investigation. This same rule applies to the disease of other joints, more especially to the chronic diseases of the knee-joint.

All these circumstances are decidedly of sufficient importance to attract the attention of the profession, and I should be highly gratified if I have contributed my share to the better understanding and discrimination between causes and effects in this disease.

SYMPTOMS.

The symptoms of this disease vary according to the different stages in which we find it, and the character of the inflammation, whether it be acute, or chronic, rheumatic, strumous, or purely traumatic. In order to render the subject more clear, I shall divide them into *three different stages*: *first* stage—or inflammatory; *second* stage—effusion, with *eversion*, abduction, and *apparent* elongation; *third* stage—rupture of the capsular ligament, escape of the effused fluid, *inversion*, adduction, and *apparent* shortening.

FIRST STAGE.—The symptoms in the earlier part of this disease are sometimes obscure, particularly if the inflammation be of a low grade, or of the chronic character, as we generally find it in those of a strumous diathesis; they are referred to the knee instead of the hip, and this frequently misleads the careless observer, so that I have many times seen the knee blistered, and treated for months, when there was no disease whatever at that joint, it being merely affected by sympathy with the disease, which was in the hip. There will be a slight halting in the gait, or limp. When the child stands he will rest the weight of the body on the sound limb, the diseased one being thrown forward; there is very imperfect flexion; the knee on the well side can be brought up to the chin, but on the diseased side it cannot be, and this difference in flexibility is almost diagnostic. *Pressure* over the trochanter, or behind, or in front of the same, or with the femur, so as to bring the head of the bone against the acetabulum, *produces* pain. *Pulling* the limb slightly but constantly for a few minutes, so as to remove this pressure from the acetabulum, *relieves* the pain. And if a careful examination be made by *pressure* and *extension* there will be no difficulty in making a diagnosis. If the *ligaments* are involved, as they sometimes are, by a wrench or strain, or rheumatic inflammation, then *extension* *increases* the pain, and *pressure* *relieves* it; but if the synovial membrane, cartilage, or bones, be involved in the disease, then *pressure* *aggravates the pain intensely*, and *exten-*

sion, gradual and slight, but constant, for a little while, relieves it almost entirely.

It is a remarkable fact, that the *synovial membrane* when in a healthy state, in common with all serous membranes, possesses no sensibility whatever, and will bear pressure of the severest kind, without the least sensation of pain, as is proved by jumping from great heights and striking upon the heels, producing no pain whatever. Yet when this membrane is inflamed, the slightest amount of pressure produces the most intense suffering, as we also find in pleuritis, peritonitis, &c.; and hence the necessity of *removing all pressure* from this delicate and sensitive membrane when in a state of inflammation.

SECOND STAGE.—This inflammation, unless arrested, will readily produce effusion, and if this be of much amount, it will produce a *peculiar deformity*, viz., an *apparent* elongation of the limb; *eversion* and abduction; flattening of the natis; the rima natis on the diseased side being lower than on the sound side; flexion of the thigh on the pelvis, and the leg slightly flexed upon the thigh. If the effusion be excessive, or the inflammation acute, you will have an *apparent* ankylosis, caused by muscular contraction, which is an involuntary act, produced by reflex action of the inflamed or irritated nerves, *and is done for the purpose of keeping the joint perfectly still*. It affords the natural indication for the surgeon by imitating this action, to accomplish the same result, of *perfect rest* to the inflamed synovial membrane. This we may do in a much more effectual manner, for at the same time we succeed in relieving the other parts from a *pressure* which, if long continued, must cause, in the absorption of the cartilage and bone, the destruction of the joint. Motion, when not accompanied by extension, is much more painful than rest, even if accompanied by the pressure caused by the muscular contraction. Hence the patient, naturally choosing the least of two evils, obtains rest of the part by muscular rigidity, even at the expense of the absorption arising from the pressure, as well as of the hectic and *exhaustion caused by this constant muscular effort*.

The flexor muscles of the thigh, the tensor-vaginæ femoris, the pectineus, and rectus-femoris, are so firmly contracted that the whole pelvis moves on the opposite acetabulum; in short, the ilium of the opposite side may be distinctly seen to move upon any attempt to rotate, adduct, or abduct, the diseased limb. Even under chloro-

form this motion takes place *unless firm extension* is made before the trial is begun, as I have seen in several instances.

This rigidity does not depend upon true or bony ankylosis; for by division of the flexor and adductor muscles, or by puncture of the joint, you will have free motion of the limb, showing that there has been no bony ankylosis.

That the mere presence of liquid in the perfectly closed joint is capable of producing, and therefore accounting for the said immobility, is clearly demonstrated:

1st. By the experiments of Prof. E. W. Weber, who *injected the hip-joint* from an opening in the pubic bone, and by which procedure he invariably produced *eversion* and *abduction* of the *thigh*, besides *immobility* of the *joint*. The latter was so complete, and so unalterable, that an attempt to overcome it drove either the stopper out of the artificial opening, or burst the capsular ligament.

2d. By the puncture of joints morbidly distended, in which case the mobility and proper position of the thigh become at once established.

It should, however, be borne in mind that the symptoms of *eversion*, *abduction*, and *immobility*, may sometimes be continued even after the capsule has become ruptured, and are then dependent upon the altered condition of the capsule and surrounding parts, these having become thickened and attached, and being thus unyielding, necessarily retain the parts in their malposition.

THIRD STAGE.—If the disease is not arrested, the acetabulum becomes perforated, or *ulceration* and *rupture* of the capsule take place, and the fluid, whether synovia, pus, or plastic lymph, becomes effused in the surrounding tissues, and in the majority of instances burrows in various directions, and finally produces an opening in different portions of the thigh; sometimes only one, but frequently more, and in many instances, some distance from the affected joint.

The peculiar change that takes place, in many instances, upon the rupture of the capsule, in all the symptoms, and the suddenness of the occurrence have led to the *false idea* that a *luxation* had taken place. But we need only refer to the able, masterly, and in fact unanswerable paper of Dr. Alden March, of Albany, presented to the Am. Med. Association, and published in their *Transactions* in 1853, to prove the error of this opinion, and which, previous to the appearance of his paper, was the one universally adopted. In fact the profession in this country are indebted to Dr. March for the

first clear, comprehensive, and correct statement of the true pathology of this disease; and the basis was laid down by him for the proper plan of treatment, from which all the improvements since have been developed.

When the capsule is thus ruptured, if no attachments have already occurred, the limb becomes *apparently* shorter, adducted, inverted, flexed in hip only, pelvis raised and projected backward; in fact, the position is almost the reverse of what it was in the second stage, and in order that they may be better comprehended, I will take the trouble, even at the expense of being considered tautological, of arranging them side by side for more easy reference, with a drawing taken from life, illustrating the peculiar deformity that occurs in each.

This change from the second into the third stage is *sudden* when the opening in the joint is large, and allows of the total escape of its contents, into the surrounding tissues, or *gradual*, if the opening be small or fissure like. I have seen the former take place in a night, and the latter require weeks, until the change was accomplished. It is possible also that the bottom of the acetabulum may give way to such an extent that the head of the bone may sink so deep into it, as to retain the limb in its former position.

SECOND STAGE.

Limb (apparently) longer,
 " adducted.
 " everted.
 " flexed in both joints.
 Foot touches the ground with sole.
 Toes everted as in fracture of neck.
 Pelvis lowered on diseased side.
 " projected forward.
 " angle of inclination acute.
 Natis low and flat.
 Linea inter-nates inclined towards affected side.
 Pain most intense.

THIRD STAGE.

Limb (apparently) shorter.
 " adducted.
 " inverted.
 " flexed in hip-joint only.
 Foot touches with ball only.
 Toes inverted as in post. sup. luxation.
 Pelvis raised.
 " projected backwards.
 " angle of inclination almost right.
 Natis high and round.
 Linea inter-nates deviates from affected side.
 Pain greatly diminished.

Figs. 3 and 4, taken from life, are good examples illustrating the difference in the peculiar deformity that occurs in the second and third stages of the disease.

As an evidence that the mass of our best authorities have always considered the peculiar deformity which occurs, in what I have described as the third stage of the disease, dependent on a *true luxation* of the head of the femur upon the dorsum of the ilium, and not upon muscular contraction and twisting of the pelvis, we

need only refer to the following text books of surgery, which are found in every physician's library..

Fig. 3.



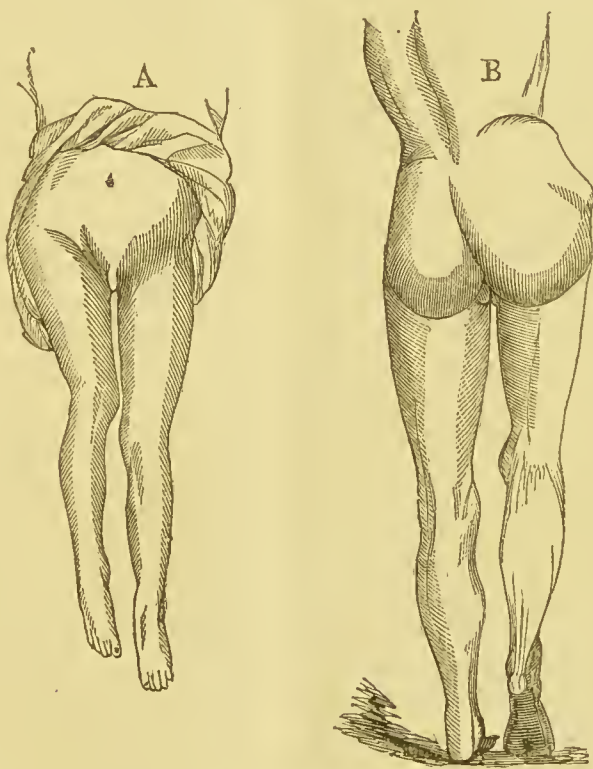
SECOND STAGE OF HIP-DISEASE.

R. Druitt, in his *Principles and Practice of Modern Surgery*, says, in his chapter on hip-disease: "But if the disease proceed, it is succeeded by another kind of shortening, caused either by the destruction of the neck of the femur by caries, or (as is more commonly the case) by the destruction of the acetabulum and capsular ligament, and *dislocation* of the bone upwards by the muscles."

James Miller, in his *Practice of Surgery*, under the head of morbus coxarius, says: "As disorganization advances within, the joint becomes more and more loose, and *dislocation* may occur by *muscular action alone*, without the intervention of a fall or other injury. The dislocation is usually upwards on the dorsum of the ilium."

Sir Charles Bell, in his *Institutes of Surgery*, remarks: "Another peculiarity in the position of the patient with diseased hip, is that of throwing the thigh of the affected side over the other, that the head of the thigh-bone becomes as a lever loaded at the lower end, by which the upper end is raised and the *pressure taken off the inflamed glenoid cavity*. It is a position of *great relief*; but the consequence is *actual dislocation* in extreme cases."

Fig. 4.



THIRD STAGE OF HIP-DISEASE.—(A) anterior view. (B) posterior view.

Dr. March states: "It has been my privilege to examine the specimens of this disease in the London University Hospital Museum, where Mr. Bell's morbid specimens are deposited, and yet I could discover no preparation of 'hip-disease' where it appeared in

the least degree as though the head of the femur was luxated during the life of the patient."

Baron Dupuytren, on the *Injuries and Diseases of the Bones*, subject Congenital Dislocation, says: "Whatever importance may be attached to this dislocation in the abstract, it is deserving of still more attention on account of its presenting all the signs of *luxation consequent on disease of the hip-joint*, with which it has *always been confounded*." And in another place he remarks: "It (congenital dislocation) does not include that painful and cruel disease of the hip-joint which usually results in *spontaneous dislocation of the femur*."

None of the above authors, although so positively stating that luxation occurs in this disease, have sustained their assertions by the evidence of a *single post-mortem examination*.

Chelius, Pirrie, Liston, Saml. Cooper, and Gibson all agree with the authors above quoted in regard to the spontaneous luxation of the hip in the latter stages of the disease. And even Sir Astley Cooper, in his treatise on *Dislocations and Fractures of the Joints*, says: "Dislocations may arise from ulceration, as we frequently find this state of the parts in the hip-joint; the ligaments ulcerated, the edge of the acetabulum absorbed, the head of the thigh-bone changed both in its magnitude and figure, *escaping from the acetabulum* upon the ilium, and there forming for itself a new socket."

These references could be increased until they embraced all the authors that I have had the privilege of referring to; but as I have quoted from a sufficient number to establish the fact, that the idea of luxation in hip-disease has been one of almost universal adoption, I will not add to the length of my paper by making further references; and yet it must be borne in mind that, notwithstanding the high position of the authorities I have quoted, not one of them has proved his assertion by a *single post-mortem*. But, on the contrary, whenever any one of them has made a post-mortem examination, or has cut into the joint for exsection, he has invariably found that *no luxation* had taken place; but that the "head of the femur was still within the capsular ligament," much absorbed, probably, and *frequently separated* from the *shaft of the femur entirely*, thus permitting the *trochanter major* to slip upon the dorsum of the ilium; and this no doubt has been mistaken for true luxation. I have seen this condition of the parts more than once, and seen the mistake made by most excellent surgeons. At other times the acetabulum has been found "*much enlarged by absorption, and ex-*

tending upwards and backwards, as if nature had made an attempt to form a new joint in this direction." As the upper portion of the acetabulum is absorbed by the constant pressure, the periosteal inflammation, which is occurring at the same time outside of the joint, is constantly throwing out new material, and we even find firm osteophytes of considerable magnitude; and thus, as the progressive absorption goes on within the joint, there is a constant deposition outside of the joint, by which means the acetabulum, with the capsular ligament and contents, is, as it were, slipped up on the dorsum of the ilium; so that instead of a luxation of the hip, we have in fact a luxation, or rather a displacement of the acetabulum itself; and, if the disease is of long standing, this is frequently perforated, the synovial membrane and cartilages more or less destroyed by ulceration, the bones carious or necrosed, the ligamentum teres invariably destroyed, and the joint filled with pus; or else you will find the capsular ligament perforated by ulceration at one or more places through which the pus has escaped, and this generally occurs at the inner and lower border of the acetabulum. This, according to my observation, has been the real pathological condition of all the cases that I have examined; and it very satisfactorily accounts for the shortening and other appearances of luxation.

If you diminish the head of the femur by absorption three-fourths of an inch, as is often the case, and extend the acetabulum upward and backward to the same amount, the gluteal and other muscles keeping the bones in close contact, will thus give you an inch and a half of shortening of the limb; and the twisting of the pelvis and its rotation on the body will increase this shortening, and produce the other symptoms which have been mistaken for luxation.

To illustrate my position, I will quote a *post-mortem* examination from Sir Benj. Brodie's work on *Diseased Joints*, published in 1834:

"A middle-aged man was admitted into St. George's Hospital in the autumn of 1805, on account of a disease of his left hip. He labored also under other complaints, and died in the February following. On inspecting the body, the soft parts in the neighborhood of the joint were found slightly inflamed, and coagulated lymph had been effused into the cellular membrane round the capsular ligament. There were no remains of the round ligament. The cartilages had been destroyed by ulceration, except in a few spots. The bones, on their exposed surfaces, were carious; but they retained their natural form and size. The acetabulum was

almost completely filled with pus and coagulated lymph; the latter adhering to the carious bone, and having become highly vascular. *The head of the femur was lodged on the dorsum of the ilium.* The capsular ligament and synovial membrane were much dilated, and at the superior part their attachment to the bone was thrust upwards, so that, *although the head of the femur was no longer in the acetabulum, it was still within the cavity of the joint."*

Here we have the testimony of Sir Benjamin Brodie, that "*the head of the femur was lodged on the dorsum of the ilium,*" and in almost the next sentence, he says, "*it was still within the cavity of the joint.*" Comment, it seems to me, is unnecessary, for this cannot be called luxation, according to the ordinary definition of that term.

In *Braithwaite's Retrospect*, No. 22, Jan. 7, 1851, page 196, is a case of exsection of the head of the femur, for "hip-disease," by Mr. Skey. After giving the age, sex, and previous condition of the patient, he describes her condition on admission to the hospital, and says: "*The left femur was dislocated on the dorsum ilii, the limb shortened, and the leg and thigh flexed.*" After consultation, "it was considered that removing the head of the bone would give the patient the best chance of recovery." He then describes the operation and the morbid appearances he observed about the joint. He states that "*the acetabulum was found to have been enlarged by absorption, and was extended in a direction upwards and backwards, as if an attempt had been made by nature to form a new joint in this direction. The head of the femur had been entirely absorbed; a portion of the neck remained, which, with the great trochanter, was the part removed.*" I would simply ask, how it was possible that there could have been a "*dislocation on the dorsum ilii,*" if "*the head of the femur was entirely absorbed?*" Can a bone be luxated when it has no existence? The answer it seems to me is perfectly plain. The luxation never took place.

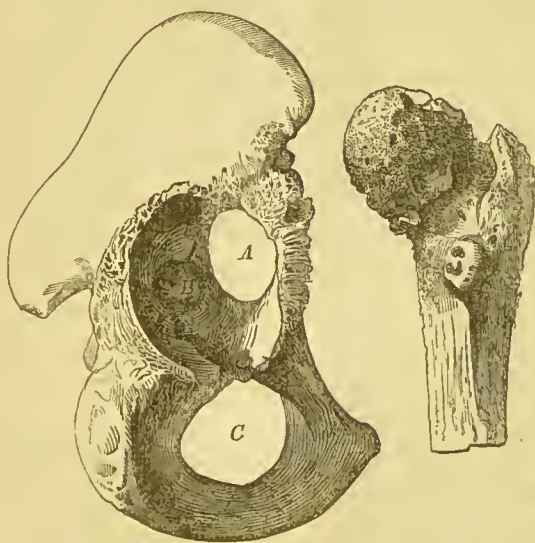
In the tables of exsection which I have collected, it will be observed that in many of the cases the authors, in describing the condition, have stated that the "head of the bone" was "luxated spontaneously," and yet by a careful study of all the fully described cases that I have been able to read, I am fully satisfied that no luxation had taken place; but that either the head of the bone had been absorbed, or was separated from the neck, thus letting the trochanter slide high up on the dorsum ilii.

I do not deny that luxation can take place in morbus coxarius,

as well as in a healthy joint; but, on the contrary, a much less force ought to be able to produce it; but if the nurse in lifting the patient out of bed, or by twisting the leg across the other, thus ruptures the capsule and produces a luxation (as I have seen done), it is as much a *traumatic luxation* as if it had been produced by a fall from a house or any other accident. And if a careful inquiry is made in all the cases of so-called "*spontaneous luxation*," we will find that they have occurred after the application of violence more or less severe, and not as the result of unaided "muscular contraction," according to Miller and other authors whom I have quoted.

The following specimen, Fig. 5, for which I am indebted to my friend Dr. Carnochan, shows the pathological condition of the femur and acetabulum, in the majority of fatal cases of morbus coxarius, except that in this specimen there are more *exostoses* or osteophytes around the enlarged border of the acetabulum than we generally find. It will be seen in this specimen how the acetabulum is enlarged upward and backward, in fact in all of its diameters. At A, a large perforation connecting with a pelvic abscess, and at B,

Fig. 5.



an extensive ulceration quite deep in the bone. The head of the femur, it will be observed, is very much diminished in size and carious. The capsular ligament was not ruptured, but was attached to the femur in its normal condition and to the enlarged acetabulum at its border, where the roughened exostosis is distinctly seen.

This was a case of hip-disease of nearly three years' standing, the result of an injury in a previously good constitution, and the disease progressing so insidiously that the patient did not apply for treatment to any surgeon until it had arrived at its third stage, when it was mistaken for dislocation and so diagnosticated by all who saw it; and yet the *post-mortem* revealed the fact that the capsular ligament had never been ruptured, but still contained the head of the femur which had never been out of it.

This case was not brought to the city until he was almost in a moribund condition, and then the gentleman who saw him, and who is one of the best surgeons in this country, mistook it for a luxation upon the dorsum ilii, and presumed, from the careless manner in which the history of the case was detailed, that it had occurred at the time of the accident more than two years before, and as it was a hopeless case nothing was proposed for it. I never saw the case until after death, when, upon making careful inquiries among his friends, I found that the limb had been in its present shortened position only a few months, but previous to that it was as they "thought much longer and more crooked in the knee, and a great deal more painful, and since his leg had become shorter he was much easier of his pain, but his constitution run down so fast they feared he would die," and therefore brought him to the city for relief. This simple statement clearly explains the case, according to my description of the changes that take place in the second and third stages of the disease. And the perforation of the acetabulum, thus permitting the escape into the pelvic cavity of the contents of the joint, satisfactorily accounts for the change that occurred in the position of the limb, and for the relief from pain which the patient experienced at the time the perforation occurred.

DIAGNOSIS.

Morbus coxarius may be confounded with sacro-iliac disease. In the first and second stages of coxalgia we may have elongation of the limb; this *always* occurs in sacro-iliac disease; but in coxalgia, the elongation is discovered by measurement from the anterior superior spinous process of the ilium to the internal malleolus, the elongation being caused by effusion into the hip-joint. If the disease is between the sacrum and ilium, this measurement between the malleoli and superior spines of either side will be equal, and

the elongation will be found to be dependent on the displacement of the diseased ilium itself, which is tilted forward and rotated or slipped downwards, owing to the swelling and destruction in the affected articulation. The anterior spine is not only lower down than its fellow of the opposite side; but is pushed forward and is much more prominent, and this is not produced by any obliquity of the pelvis consequent on a twist of the spine, as in hip-disease; but by the tilting forward and rotation downwards of the whole of the diseased side of the pelvis.

The *seat* of pain is also different in the two diseases. In hip-disease it is most acute, when pressure is applied firmly behind and above the trochanter major, or when compression is exercised against the anterior part of the hip-joint through the pectineus muscle. In sacro-iliac disease little or no pain is experienced when pressure is made in these situations; but tenderness is elicited by pressure upon the sacrum and along the line of junction between the sacrum and ilium behind, and altogether away from the joint.

The movements also which occasion pain in the two diseases are entirely different. In hip disease, abduction and rotation outwards, or pressure of the head of the femur into the acetabulum, aggravate to a greater or less degree, often to an unbearable extent, the sufferings of the patient. In sacro-iliac disease the thigh may be moved in all directions, abducted or adducted, rotated, flexed, or extended, when the patient is lying on his back without any increase of pain, *provided the side of the pelvis be immovably fixed at the time by an assistant*. Should this precaution of holding the *pelvis immovable* not be observed, the movements of the thigh will be communicated to the diseased articulation of the ilium and sacrum, and necessarily occasion suffering.

For a differential diagnosis of most of the other diseases with which morbus coxarius may be confounded, the following table of differential diagnosis, with some alterations, taken from the notes of a lecture of Dr. Louis Bauer, in the Long Island College Hospital of Brooklyn, may be consulted with advantage.

FRACTURE AND DISTASIS OF HEAD.

Produced suddenly.
Eversion of limb.
Shortening of limb.
Straight limb.
Loose articulation.
Straight pelvis.
Crepitus.

SECOND STAGE OF MORBUS COXARIUS.

Growing comparatively slowly.
Eversion and abduction of limb.
Apparent elongation of limb.
Flexed in hip and knee.
Fixed hip-joint.
Oblique pelvis.
No crepitus.

Spine vertical.	Spine curved.
Shoulders square.	One shoulder higher.
Nélaton's test (apex of large trochanter above the line). ¹	Nélaton's test (trochanter below the line).

The *impacted fractures* are of course excluded in this collection of differential symptoms.

Dislocation of Femur.

ANTERIORLY AND SUPERIORLY.

Suddenly produced.
Extremity much everted.
Immobility.
Moderate shortening.
Abduction.
Head can be felt in the groin.

SECOND STAGE OF MORBUS COXARIUS.

Comes on gradually.
Less everted.
Immobility.
Apparent elongation.
Abduction.
Head cannot be felt at all or very indistinctly, and then at the acetabulum.

POSTERIOR SUPERIOR DISLOCATION.

Produced suddenly.
Limb shortened and everted: *inverted*
Adducted.
Immobility of articulation.
Flexion of the hip.
Moderate shortening.
Head usually felt under glutæus maximus.
Apex of trochanter above Nélaton's line.
No stationary contractions of muscles.

THIRD STAGE OF MORBUS COXARIUS.

Growing gradually.
The same.
" "
" "
" "
Apparent shortening considerable.
Head not felt at all.
Below or even with Nélaton's line.
Permanent contraction of flexors and adductors.

Pelvis square.
Walks with healthy leg bent.
Touches ground with almost entire sole.
Spine straight.
Angle of inclination of pelvis unchanged.

Pelvis raised and oblique.
Healthy leg straight.
Only with the ball of the foot.
Spine flexed laterally and anteriorly.
Angle of inclination of pelvis increased.

POTT'S DISEASE AND PSOAS ABSCESS.

Preceding pain in the *spine*.
Posterior and anterior deformity (not always).
Simple flexion and shortening of limb.
Limb may be extended under chloroform.
Pelvis square.
Nates even.
Cannot walk except by supporting the spine by resting hands on the knees.
Abscess under Poupart's ligament.
Hip articulation free.

THIRD STAGE OF MORBUS COXARIUS.

Preceding pain in hip-joint.
Lateral and anterior deformity.
Flexion, adduction, and inversion.
Cannot.
Pelvis oblique.
One higher.
Can walk on well leg and without these precautions.
May have the same.
Almost fixed.

¹ Nélaton's test is made by drawing a cord from the tuber-ischii to the superior spinous process of the ilium, which will generally pass at the *very apex* of the trochanter major; now in fracture of the neck or in true luxation, the apex of trochanter will be found above this line.

Slight retraction of flexors.

May have signs of paraplegia.

Fixed contractions of both flexors and adductors.

Has none. Order of development very different. If there is perforation of the acetabulum, it may be ascertained by an examination through the rectum.

PERIOSTITIS OF FEMUR,

Mostly commences suddenly.

Femur more or less enlarged.

Femur painful on pressure.

Joint free.

Extension and abduction impeded.

Joint painless.

Pelvis oblique and spine curved.

Contraction of flexors and adductors.

THIRD DEGREE OF MORBUS COXARIUS.

Grows gradually out of preceding stages.

Not at all enlarged.

Femur not painful in the least.

Almost fixed, and when moved often have crepitus.

The same.

Joint painful on pressure.

The same.

The same.

TREATMENT.

FIRST STAGE.—In the treatment of this disease in its first stage, local depletion by leeches or cups is often necessary, with a relaxed condition of the bowels. But the most important of all, and in which all prospect of success will depend, is *rest of the joint, and perfect freedom from pressure of the inflamed synovial membrane*, together with such constitutional remedies and general support of the system as may be requisite in each particular case. The use of issues at this stage of the disease is worse than useless, and only does harm instead of good. And the only good they have ever done, was from the fact that they made the parts so painful that the patient was compelled to keep more quiet than he otherwise would have done. The occasional application of iodine may be of some service; but in the majority of cases, I have found the application of leeches and ice to be much the most beneficial. If left to itself, the rest which is so essential to the joint is procured by the firm muscular contraction which prevents the motion in the joint, and is so perfect as in many instances to assume the appearance of genuine bony ankylosis.

But this *constant muscular contraction* exhausts the nervous system, and induces hectic fever, gives the child nocturnal spasms of intense agony, caused by pressure of the head of the femur against the acetabulum, and produces absorption of both bones, and prevents nutrition of the limb which results in atrophy. I, therefore, resort to artificial means to produce this rest and remove this pressure, and formerly divided the firmly contracted muscles, to prevent

the head of the bone from being pressed against the acetabulum, and kept them at rest in the horizontal position in the "wire breeches" invented by Dr. Bonnet, of Lyons: but now accomplished the same result by gradual but *permanent* extension by the means of the instrument I have devised, with very much more satisfactory results and without any danger of anehylosis, or by a weight and pulley as suggested by Sir Benjamin Brodie.¹ If we keep them in the straight splint, as recommended by Dr. Harris, or Dr. Mareh of Albany, or in the wire breeches of Dr. Bauer, and keep up extension, we will relieve our patients from all suffering it is true, and generally arrest the disease. But unless the greatest care is observed, and in the later stages of the treatment the patient frequently removed, and passive motion employed, it will almost invariably result in anehylosis more or less complete, and so far as progression is concerned, the patient is in a much worse condition than when left to nature, according to the plan of Dr. Carnochan, for then the muscular contraction flexes the thigh upon the pelvis, and being anchylosed in this position they can sit down, which they cannot do when in the straight position, and have much greater facilities in walking than when anehylosed in the straight position. If we attempt the passive motion in order to prevent anchylosis, it is of the greatest importance that *extension should be made at the same time*, or we will re-excite the disease, and have again to repeat the same tedious horizontal posture, and this long confinement is likely to endanger the general health from want of exercise. It was in consequence of this accident occurring in several instances, that I was led to contrive some plan by which extension could be maintained which would remove pressure from the synovial membrane of the acetabulum and head of the femur, and at the same time permit motion of the joint, thereby retaining the capsular ligament in a healthy condition, *for motion is just as essential to a joint as light is to the eye*; it is *in fact its physiological function*, and as the eye

¹ Extract from Chelius' Surgery, edited by South, American reprint, page 296. Brodie says as follows: "At a later period when, in consequence of the extensive destruction of the articulation, the muscles begin to cause a shortening or retraction of the limb, I have found great advantage to arise from the constant application of a moderate extending force, operating in such a manner as to counteract the action of the muscles. For this purpose an upright piece of wood may be fixed to the foot of the bedstead, opposite the diseased limb, having a pulley at the upper part."

At page 300 is the following observation: "Ducros' case, already mentioned, appears to have been cured by continued extension for 50 days."

would eventually lose its power of vision if wholly excluded from the light, so the ligaments around a joint will become fibro-cartilaginous, or even osseous if entirely deprived of motion, particularly if a chronic inflammation is going on within the joint with which they are connected.¹

For a full description of my instrument, mode of application, and principles which govern its use, see remarks in connection with the case of J. C., page 499.

SECOND STAGE.—The treatment in this stage of the disease must necessarily differ according to the condition of the joint, and the character and quantity of its contents. If the disease is of a mere subacute character, and the joint not yet disintegrated, the effusion small in quantity (which is recognized by the small degree of malposition and limited motion), repeated *moderate* depletion by leeches or cups, mild mercurial treatment both internally and externally, pressure by adhesive straps around the joint which will promote absorption directly by the pressure, and indirectly by stimulating the action of the skin; with slight but permanent extension, for the purpose of counteracting the morbid contraction of the muscles, and to relieve the pressure from the ligamentum teres, and persisted in until the more prominent inflammatory symptoms have subsided, is the only course to be adopted. This can be accomplished by a weight of from four to eight or ten pounds, according to necessity, over a pulley at the foot of the bed, and secured to the limb by means of adhesive plaster, the same as in fracture; the body of the patient being the counter-extending force. If the patient has a tendency to slide down in the bed, this can readily be obviated by putting blocks under the lower parts, thus making an inclined plane.

This treatment will be applicable to the majority of cases; but there may be some instances when the inflammation is so violent, and the pain on the slightest motion so intense, that *absolute rest* is requisite for a time; for these cases the "wire breeches" of Dr. Bauer are indispensable.

The next indication in the treatment is to bring about the absorption of the effused material. I am not of the opinion that the

¹ "M. Tessier, of Lyons, has shown that prolonged rest alone, even when little or no disease previously existed—a rest for five or six months—is sufficient to cause absorption or ulceration of the cartilages of joints. This prolonged rest also aggravates existing disease."—*Braithwaite's Retrospect*, part xxx. p. 93.

reduction of the constitution will aid in doing this, but, on the contrary, will inevitably injure the case and prejudice the prospects of ultimate absorption. And hence, I most emphatically proscribe the whole class of derivants from the mustard poultice up to the actual cautery.

This I state not only on scientific principles, but from my own practical experience. For analogy teaches us that an *inflamed* serous sac is entirely disqualified to perform absorption of plastic material until the organizable elements have become deposited on their walls and organized, and all evidence of inflammation has ceased to exist, after which the process of absorption commences of the remaining serous portion. This is necessarily a process of time, during which the patient needs no confinement; but on the contrary, the invigoration of his constitution by out door exercise, is *imperatively necessary* to accomplish the result in view.

Important as is the *absolute rest* in the *active* period of the disease, it is as *decidedly prejudicial* to the preservation of motion, not only in the affected joint, but even in the perfectly healthy joint if too long continued. I am in possession of a number of facts to prove this point, and have seen fibrous ankylosis take place in both knees, and the hip of the opposite side not previously affected, while the patient was being treated for hip-disease by too long confinement. This point is furthermore exemplified by the observation of the stiffened knee, which occurs in the treatment of fracture of the lower extremity. In fact a joint requires motion as its natural stimulus, as much as the eye requires light.

In order, therefore, to facilitate the out-door exercise of the patient, and at the same time relieve the pressure of the joint, and thus protect the patient from a recurrence of the inflammation, I resort to the instrument previously referred to.

If the inflammation of the hip-joint is of an intense and highly acute character, as manifested by the most aggravated symptoms of local pain, and general constitutional disturbance, the patient of a vigorous constitution, the cause of a clearly traumatic nature, and suppuration has not as yet commenced, I deem an *energetic* anti-phlogistic treatment necessary, as the safest method to bring the inflammation to an abortive termination. In such instances, however, if the effusion and its consequences, malposition, &c., are considerable, acting as a new excitant for the perpetuation of the inflammation; it not only distends beyond measure and endurance,

the capsular apparatus, and irritates its respective structure; but it also reflects most detrimentally upon the general constitution.

In this condition the prompt removal of the morbid contents from the joint becomes absolutely necessary, and never fails to give immediate relief of all the most prominent symptoms, and to restore rest and comfort to the patient. In fact it is the only anodyne which will perfectly relieve the pain.

In removing this intolerable hydrostatic pressure I simply imitate nature, which accomplishes the same result by a spontaneous rupture of the capsule.

There are two ways of performing this operation, viz., *puncture*, as suggested, if I am not mistaken, by Boyer, or *subcutaneous incision of the capsule*, as recommended by Goyrand, both in hydrothrosis.

In the treatment of inflammatory diseases of the joints for the purpose of removing the morbid effusions, and as a direct antiphlogistic remedy, Dr. Bauer was the first who employed this method with most happy results. I did the same years ago,¹ and other sur-

¹ H. Y. Werckmuller, aged 35, of vigorous and robust frame, and had always enjoyed perfect health; while crossing the corner of Broadway and Chambers Street, about the 1st of November, 1855, during the erection of the Shoe and Leather Bank, was struck on the right thigh and hip, by the accidental fall of a large piece of timber, which produced such intense pain at the time, that he was compelled to sit down on the stone steps in the street for more than two hours, before he was enabled to move; and, according to his own description, "looking like a drunken man leaning against a post." He walked home, a distance of one block, with great difficulty, and was confined to his bed for three days, suffering great pain, principally in the knee. He had no medical advice at the time, but applied fomentations and stimulating liniments to his limb. After the third day he got out of his room, and with some difficulty could walk a little; but the pain in the knee continued for ten or twelve days very severe, and then gradually subsided. About the 20th of December he began to feel pain in the hip-joint, and loss of appetite; this increased very much until the 24th of December; he again took his bed, and was confined until the 4th of January, 1856, when he again got out, and walked for two days, feeling, however, some pain all the time. This exercise so aggravated his disease, that his limb began to elongate and turn outward, and stiffen in the joint, and with this change of position, his pain became so intense, that he was compelled to call in medical aid. Dr. Riggs saw him, and looking upon it as a case of rheumatism, treated him accordingly for about six weeks.

His symptoms grew constantly worse, and his pain was intense and constant, requiring very free use of opiates. The spasmodic cramps at night were very frequent and severe. Entire loss of appetite, and very rapid emaciation. As there was no other joint involved, and the disease seemed rapidly progressing, and yielding to no treatment applied, the doctor began to doubt its rheumatic cha-

geons under pressing circumstances have, without doubt, resorted to the same as an expedient for immediate relief, and with a view only of withdrawing purulent matter; but Dr. Bauer has clearly demonstrated the therapeutical efficacy in inflammation of the joints, even before it has proceeded to suppuration, and is I believe the first person who ever punctured the hip joint for this purpose, viz., the removal of non-purulent inflammatory effusion. These two operations, although essentially the same, differ, however, in this point: that in the puncture the fluid is removed entirely from the body, while in the other it is permitted to diffuse itself in the cellular tissue around the joint; and this difference qualifies their respective therapeutic value. If we have *plastic* material only in the joint, *either* operation is admissible; but if the fluid is *sero-purulent*, the *puncture* by *trocar* is preferable, inasmuch as it precludes the danger of consecutive abscess which almost inevitably

racter, and called me in consultation, on the 18th of February, 1856. I found him semi-recumbent, with his right leg bent at the knee, over a pillow, everted and abducted; adduction or rotation was impossible, and the attempt produced the most intense agony. An indistinct fluctuation was discovered over the hip-joint. And looking upon it as a case of synovitis, with effusion, I applied iodine over the joint, and then long adhesive strips with firm compression, and a tight roller from the toes up over the hip, in order to promote absorption. Iodide of potassium was given internally.

This treatment was continued until the 24th, six days, when I again saw him, with Dr. Riggs. He was more emaciated, and had had frequent chills and sweats. The limb was in the same position, and the pain on attempt at motion more intense. On removing the plaster, I found the fluctuation more distinct, and as the limb was more everted than before, and absolutely immovable at the hip-joint, I determined to puncture the joint, in order to prevent a rupture of the capsule.

I punctured the joint with a small tenotomy knife, behind the trochanter major, and *pus* escaping, I extended the puncture to a free incision of about five inches, and then opened the capsule freely. Nearly a teacupful of pus escaped, and the limb almost immediately assumed its natural position. There was no crepitus detected; and, with the finger in the capsule, I could feel no roughness on the parts of the head with which I could come in contact. The joint was thoroughly syringed with warm water, and the wound filled with lint and covered with oiled silk.

No constitutional symptoms followed, not even a chill. He slept well all night without any anodyne—the first time for some weeks. His appetite returned, his night-sweats subsided, and all his symptoms improved so rapidly, that I ceased my attendance in a few days, and left him in charge of Dr. Riggs. There was a free but healthy suppuration of the wound at the time I left him, and my prognosis was, that he would recover with an ankylosed hip.

I have just seen Mr. Wreckmullor, and it is now more than four years since the operation. He is in perfect health, and has perfect use of the joint in all directions, and says that he has had for nearly three years.

follows the entrance of pus into the cellular tissue. As a mere explorative measure in order to ascertain the pathological condition of the joint the trocar should always have the preference.

Method of puncturing the hip-joint.—The patient should be placed on a high table and on his healthy side, and chloroform invariably administered in order to obviate the pain incidental to the motions of the affected limb, which are necessary to expel the fluid. A flat and small trocar should be used similar in shape to that recommended by Andre, for the puncture of hydrocele. The best place is immediately behind the middle line of the femur, and *above* the large trochanter close to the superior margin of the tendon of the gluteus-maximus muscle, passing thus into the joint just above and in front of the digital fossa, in which are inserted the rotators from the pelvis.

The everted and abducted extremity should then be gently reversed in order to render the capsule more tense. After sliding the skin, the trocar should be inserted perpendicularly to the body, which will bring it at an acute angle to the neck of the femur. Care should be taken that the crown of the head is not struck, if so the handle of the trocar should be slightly turned off to let the point of the instrument glide by its side into the joint. The point should never enter the joint deeper than about a quarter of an inch, so as to leave the canula about one-eighth of an inch in the joint. The immense distension which is the only condition which will justify this operation, renders its performance much more simple and easy than if we attempt the same on the dead body, unless previously prepared by injection.

The moment the capsule has been punctured the stiletto should be withdrawn, and at the same time the affected limb steadily inverted, adducted, and rotated over and across the opposite limb by a reliable assistant, by which movement the entire fluid will be discharged from the joint. This fact can be fully illustrated by experiments upon the cadaver.

This position should be retained until the canula is withdrawn, the wound carefully closed by adhesive strap and the joint carefully surrounded by *compress* and long *adhesive strips*, thus exercising pressure and preventing the air from entering the vacuum, which will be created on the return of the limb to the straight position. The patient should then be secured from any possibility of motion for at least a fortnight, either in Gibson's apparatus, or, what I like better for this purpose, "Bonnet's wire breeches." Besides the

rest, low diet, and moderate antiphlogistic treatment should be adopted.

By this plan reaccumulation very rarely takes place, but, if it should, the operation may be safely repeated if necessary, as has been done in two or three instances.

Goyrand's method as applied to the hip-joint, differs but slightly from the one just described. A two-edged small knife is used like the trocar, inserted in the same place and manner into the joint, and an opening of the capsule made for about half an inch, and finally its contents driven into the cellular tissue in the same manner as above described, by changing the position of the limb and the same after-treatment observed.

If the puncture of the joint reveals the fact that the fluid is already *purulent* in its character (which might have been clinically ascertained before by a careful analysis of the constitutional symptoms), the question rises whether this pus is simply the product of synovitis, or, whether it is connected with the ulceration of the cartilage and caries of the bone. The former has been disputed, but erroneously so, for synovial membranes, like other serous membranes, are susceptible of suppuration without ulceration, the epithelial cells being simply converted into parental pus cells, as proven by "Haidenhein." With very few exceptions, when there is ulceration of cartilage and bone, we find more or less crepitus, and this can be clearly ascertained by rotation of the affected limb after the fluid has been withdrawn.

In the absence of crepitus, and especially if the disease is of but short duration, we are justified in premising that the case is simply suppuration of the synovial membrane, and hence allow the patient the chance to recover without any further operative procedure.

Analogy teaches us that synovial membrane in a state of simple suppuration may, like serous membranes, recover its integrity by the evacuation of its morbid products, in proof of which we need only to refer to Dr. Bowditch on Empyema. I therefore treat this punctured wound as already stated, *when it was simply organizable lymph*, and rather repeat the operation in case of reaccumulation, than to leave it open by a free incision.

If we, however, satisfy ourselves of the fact that the articular surfaces have become ulcerated, the cartilages disintegrated and partly detached, the bones corroded, which can be ascertained without difficulty by the crepitus which is peculiar to itself, and altogether different from the crepitus of healthy bone, we consider the

exsection of the joint not only justifiable, but in most instances absolutely essential.

Under similar condition of other joints, more especially where the disintegration is of but limited extent, I have freely opened them, inserted setons through them, injected them with iodine, and attained thereby satisfactory results. In some instances I have even had perfect recovery, with free motion of the joint.

But the same principle of free incision seems not to be applicable to the hip-joint; since the conformation of the joint, its deeply seated situation and investment with soft parts, opposes the free exit of the discharge. In fact, the hip-joint can hardly be said to be freely opened without removing the head of the femur, which fills it completely.

THIRD STAGE.—We have invariably in this stage of the disease a rupture of the articular apparatus either of the capsule, or a perforation of the acetabulum, but the character of the disease differs widely, whether inflammation and plastic lymph caused the rupture, or whether ulceration of cartilage and bone and consequently *purulent* effusion brought about that change. In the former the lymph escapes into the cellular tissue, spontaneously relieving the hydraulic pressure of the joint, and the most prominent symptoms, and in fine organizing itself into new tissue, leaving, however, adhesion of the joint, and the extremity in a state of malposition, thus effecting a spontaneous cure. This variety of the disease is by no means rare, and has led many a surgeon to rely on the simple efforts of nature more than on surgical art.

Nor do I propose for such cases any active interference, but only the contrary. I only suggest to assist nature in effecting this spontaneous cure by mechanical appliances in relieving the joint from pressure, in permanently distending the morbidly contracted muscles, and in fine in securing the perfect mobility, usefulness, and normal position of the extremity.

If the cure has been thus effected by the unaided efforts of nature, it is invariably done by a fibrous ankylosis of the joint and the characteristic malposition of the extremity previously described. Even this result of the disease formerly considered as an incurable spontaneous luxation, though the most fortunate termination that was to be expected in this disease has now been brought within the scope of surgical art, and is susceptible of perfect relief.

The division of the contracted muscles implicated in the defor-

mity, the forcible breaking up of the adhesions under chloroform, and the proper orthopædic treatment afterwards have, in numerous instances, re-established the proper form, motion, and usefulness of the afflicted extremity.

Very different, however, is the surgical proceeding in cases of *caries*. Spontaneous cures are extremely rare, and if we deduct from them the cases of *periostitis*, which have been mistaken for and confounded with *caries* of the *hip-joint*, we will find the number reduced to a very small percentage. Indeed, a careful examination of many cases in my own practice, and an opportunity to study many cases of this disease in the practice of others, lead me almost to doubt whether it ever occurs at all. We can hardly be surprised at this state of things when we consider the many anatomical obstacles in the way of a free discharge of the detritus, which almost inevitably creates new disease of the bone in its way, and thus perpetuates the disease from the inability of throwing off the parts already destroyed.

Nature herself has but one efficient method of curing *caries*; she removes gradually and in extremely small fragments the disintegrated bone, sets up healthy granulation in the sound portion, and substitutes for the defect fibrous, and oftentimes ossifying structure. This process is extremely protracted and may require even years for the removal of a comparatively small fragment of bone. And from nature and her means of repair, we have to deduce the principles and measures which should govern us in the healing act.

These principles have long been known and practically adopted by the profession; exsections of bones and of joints for *caries* and necrosis are operations of every-day occurrence; but, strange to say, the *caries* of the *hip-joint* has inconsistently been precluded, or but rarely permitted to receive the benefit of this advancement in surgery. As for instance, Prof. Syme, who has performed numerous exsections of joints for *caries* with more than ordinary success, yet he most emphatically condemns the exsection of the *hip-joint* when afflicted with the same disease. It would seem to an unbiased mind, that the same therapeutical indications were equally applicable to the hip as well as any other joint. In fact, it is my firm conviction, that *caries* of the *hip-joint* on account of the impending danger of perforation of the cotyloid cavity, and a pelvic abscess whereby its important viscera may become involved, requires self-evidently a more prompt and decided surgical interference than when in any other joint. On a general

surgical principle, therefore, the operation of removing all carious bone, or, as it is commonly termed, exsection of the hip-joint, is not only justifiable, but imperatively demanded, and the more so as according to no less an authority than that of Prof. Syme, who says, "If the joint be *carious* the patient *must* die."

We can, therefore, lose nothing by the operation, but, on the contrary, will invariably procure at least the comfort of the patient, and in the majority of cases, as shown by my statistical record, save their lives. But this is not all, we not only save the life of the patient, but with it we also restore form and motion.

In the face of these arguments and facts, I do not hesitate to recommend most emphatically the exsection of the hip-joint when affected with caries.

Of course every exsection will not prove successful. Sometimes the disease is so connected with constitutional vitiation as not to be eradicated by a mere local operation. At other times, the disease is so extensive as to preclude the possibility of its entire removal. In either of these cases, the disease will proceed to a fatal termination. But when the disease is chiefly of a local character, the constitution not yet undermined, and its extent so limited as to admit of its entire removal by the knife and gouge, and in fine where we have the advantage of good air and proper diet, I venture to say that this operation, if performed at a proper time, offers the best possible chance of success. It follows, therefore, conclusively:—

1st. That the operation should be resorted to as soon as the diagnosis of caries has been positively ascertained. For delay can but diminish the chances of success by extending the disease.

2d. That the operation should include the entire removal of all the diseased bone and cartilage.

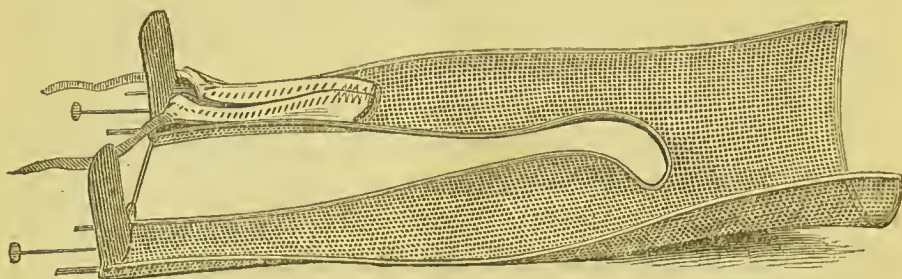
3d. That the wound should be kept open for the free discharge of pus and other disintegrating structural fragments, and especial care should be observed that no burrowing of matter takes place beneath the fascia.

4th. Absolute rest and a moderate extension should be kept up, so as not to disturb the granulation or permit the sound bones to come in contact.

The "wire breeches," repeatedly referred to, are the best apparatus known to me to insure this result. This apparatus having been fully described and illustrated by Dr. Hamilton, in his excellent work on fractures, and also published in the *Transactions of the*

American Medical Association for 1857, I have deemed a further description unnecessary.

Fig. 6.



When placed in this apparatus, the patient is firmly secured in a comfortable position, protected against the possibility of motion, while he is fully enabled to urinate and defecate without the possibility of the parts being in the least disturbed. It admits even of the patient being carried about and driven out in the open air.

For the special application of this instrument after an exsection, it is necessary to cut in it a window opposite the wound, in order to allow of its easy dressing without removing the patient from the instrument.

In the after-treatment, the most scrupulous cleanliness should be observed; for the pus is mostly, and at least for a short time after the operation, highly offensive on account of the disintegrating bone; it carries a great deal of sulphuretted hydrogen, and acts, therefore, almost like a caustic. If permitted to soak the cotton, it will almost inevitably lead to bed sores; it will attract insects, generate maggots, and certainly vitiate the atmosphere of the patient. To prevent all these difficulties, the ordinary cleanliness will not always suffice, and, therefore, lukewarm baths should from time to time be resorted to. This has the great advantage also of cleansing the wound of all decomposing material.

It must be left to the practitioner, whether he deems it necessary to add disinfectants, alterants, or tonics, as each special case may require.

While the patient is being placed in the bath, while therein, and during the removal from the same, an assistant should support and fix the pelvis, and extend the extremity, in order to prevent both the pain and irritation of the wound, and also its closure, which will inevitably take place unless the extension be continued.

The wound itself rarely requires any local application, unless the granulation is inefficient or too profuse; in the former instance,

tinct. iodine, either pure or diluted with glycerine or creasote; and in the latter instance the acidulated nitrate of mercury in preference to lunar caustic, have been found the most satisfactory agents.

When the wound has been reduced in size, and the discharge has become healthy, the granulations showing tendency to cicatrization, *then* it is time to apply *during the day* my splint, still retaining the patient in the "wire breeches" at night. This is done with a view of affording the patient the advantage of *active* outdoor exercise, and to *prevent the ossification* of the intermediate substance, which otherwise might terminate in bony ankylosis, a result by no means desirable.

According to my personal observation, the intermediate substance is formed of very firm fibrous structure, which in a comparatively short time acquires the firmness of whalebone, or at any rate a sufficient mechanical strength for the support of the patient.

The lower extremity of this intermediate substance is invariably and intimately connected with the femur, and the more closely so if the periosteum has been saved at the time of the operation; it is also connected with the surrounding soft parts, whereby it acquires additional strength; but is not *directly* attached to the ilium, but seems to form an artificial articulation.

Having had no opportunity of a post-mortem examination of an articulation of this kind in the *hip*, I am unable to give a detailed description of its anatomical construction. But I believe nevertheless, that my clinical inferences are correct, for almost all these articulations permit in a more or less limited way all the motions of a normal hip-joint, that is to say, flexion, extension, abduction, adduction, and rotation. I am fully satisfied that these motions as a general thing are not performed by the bending or twisting in the continuity of this intermediate substance; but *on* its superior extremity and against the acetabulum. As far as I can ascertain, I have found but one exception to this arrangement, viz: one case of Dr. Bauer (No. 57 of table).

With reference to this case, that gentleman who has but lately seen it, reports to me that the intermediate substance is still soft and yielding, so much so that it almost doubles up when the weight of the body rests upon the extremity. The shortening produced by this flexion of the intermediate substance amounts to two inches and a half. But when the patient is placed in the recumbent posture, the extremity can be extended to within half an inch of its normal length. The growth and development of the leg have not

in any other respect been impeded. This is the same condition in which the Dr. found the limb nine months after the operation, and as yet it has shown no tendency to any firmer consolidation. The rotation of the limb appears to be performed by a *twisting* of this intermediate substance.

The cause of this unusual softness and flexibility of the new tissue he ascribes to the excessive obesity of the patient, in which most probably this structure also participates.

For the purpose of making the views and principles inculcated in this paper more fully comprehended, I have copied from my note book several cases, each of which is a type of the different phases of the disease in its different stages, and in different constitutions. I would beg to call the particular attention of the reader to these cases, and the remarks accompanying each, as in them will probably be found a more clear and comprehensive view of my suggestions, and the reasons which guided me in their adoption, than I have been able to state in the more particularly didactic part of this report.

Morbus Coxarius far advanced—treated by division of contracted muscles, perfect rest in wire splint and then passive motion—recovered with ankylosis in straight position. Broken up and splint applied, permitting motion and exercise while keeping up extension—recovery perfect, illustrated by photographic drawings taken from life.

The following case of hip-disease illustrates in a remarkable manner the objections which I have made to the treatment, by *entire rest* in an immovable splint, viz., *the injury to the general health and the danger of ankylosis*; and at the same time the superiority of the plan I have suggested. I may here remark that the history of the case was furnished in a letter by his mother, a most intelligent and cultivated lady, and I have copied it without alteration, as it gives a perfect view of his previous condition and treatment.

"J. C., aged eight years, was a perfectly healthy child when born, and continued so until he was seven months old, when he had a severe attack of inflammation of the lungs; it passed to his bowels, and for a few months he was much prostrated.

"Through the winter he recovered his health and strength entirely, but had another attack of the same character the following spring, continuing through that summer, and again reducing him to a very low point. At the suggestion of his physician he was

taken in the early spring to the south, where his health was entirely restored, and he became in every respect a strong, large, robust boy, well developed, with limbs and figure perfectly formed.

"He was three years and a half old, when he was taking a very long walk, during which he complained much of fatigue and weariness, and, seeming unable to walk farther, sat down on a damp pavement where he remained for some time. The long walk, too much for his heavy frame, and the contact with the damp pavement in the middle of winter, produced an inflammation of the hip, which was discovered the very next day by lameness, and his inability to walk without a very decided limp.

"Drs. J. P. and W., of Philadelphia, were at once called in, and after consultation pronounced it a case of hip-disease. He was in the course of a few days placed in a splint, confining one limb, and permitting freedom to the other.¹

"This he wore for eighteen months. At the end of this period *his limb began to stiffen in the joints, and his health to decline so rapidly* that, although opposed to the advice of his physician, his friends removed the splint and took him to the country.

"The splint was left off for six months; his health improved so much with country air and slight exercise, that it was thought best, as the disease in the hip continued, to return to the splint. After again wearing it for six months, his health gave way and it was removed. During the two years following he was confined in the splint at intervals, as his health and strength permitted, but constantly growing worse, with more pain, and occasional swelling of the hip. During all this time he was attended by experienced and skilful physicians, and everything which skill and science could suggest was done.

"After four years of suffering he was taken to New York, miserably attenuated and terribly deformed, unable to walk even with crutches.

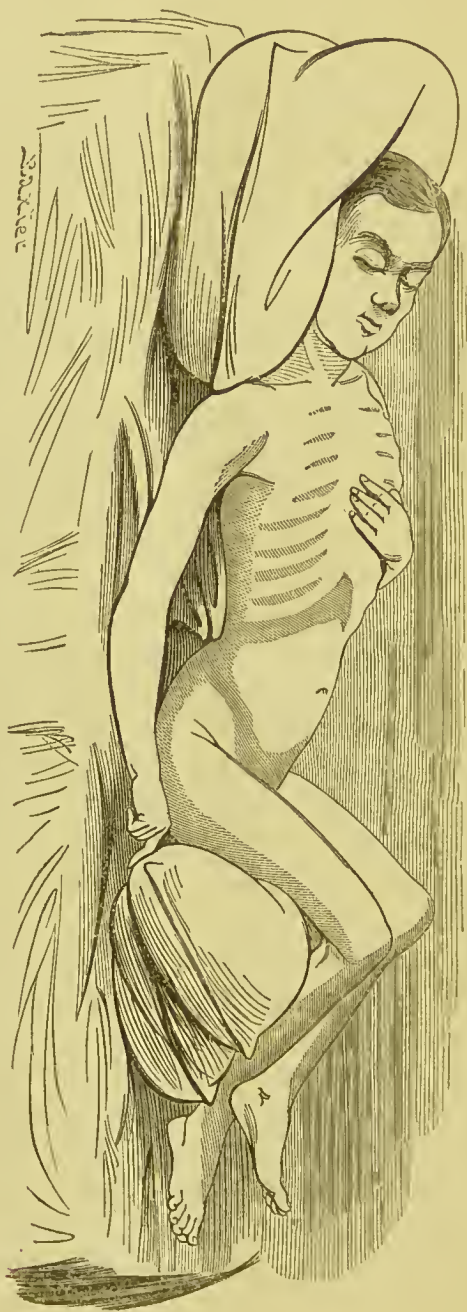
"The diseased limb powerless, very much drawn up at the knee, and his only means of supporting it was by laying it on the other leg. There was an entire loss of appetite, his nights were restless, requiring the constant use of opiates, and often waking with sudden shrieks of pain. He was unable to bear without suffering the lightest touch upon his limb, and the least motion of it gave him intense agony.

¹ She does not state whether extension was made or not.

"Dr. P., of New York, was first consulted, who thought he could not be relieved, and said that recovery with a child whose consti-

Fig. 7.

J. C.—MORBUS COXARUS OF FOUR YEARS' DURATION.—DRAWING TAKEN MARCH 9, 1850.

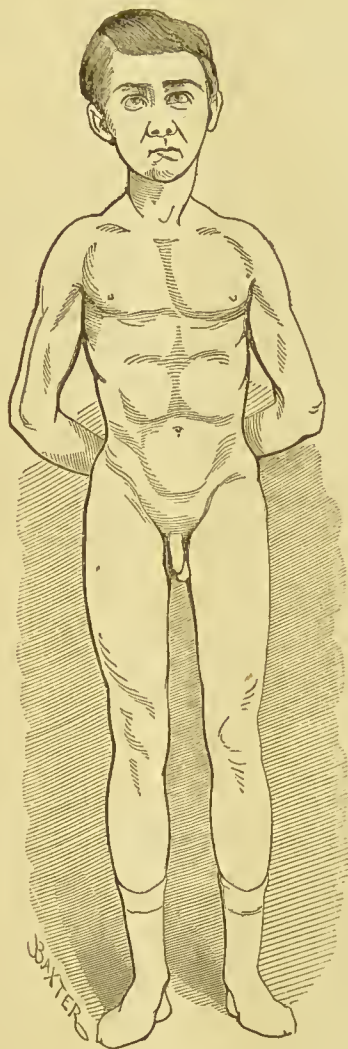


tution was so weak and shattered, would be a miracle; but that even if he rallied his deformity was hopeless. That for it no medical

skill could avail, and that it was doubtful whether he could survive. Other eminent gentlemen of the city concurred in this opinion."

On examination, he presented a white waxy tinge of the skin,

Fig. 8.



J. C.—SAME CASE AS FIG. 7.—TAKEN MARCH 1, 1860.

pale cachectic expression of countenance indicative of great suffering. The general attitude was partially recumbent on the right side and back, and semi-flexed. Pelvis twisted on the body towards the left side; thigh flexed on the pelvis, and turned outwards; heel resting on the lower part of the tibia of the opposite leg, which was

drawn very much to the left of the median line in order to get under the diseased limb and act as a support. The diseased limb appeared firmly fixed in its position, and the pelvis was twisted in order that the well limb could accommodate itself to it. The muscles of the thigh and pelvis of the left side were so rigidly contracted as to retain this unnatural position permanently; any attempt to change it pained him most intensely. In the erect posture he had to be supported under the axilla, being unable to support any weight on the sound limb, owing to the obliquity of the pelvis, which twisted towards the left side and destroyed the natural line of gravity. But as no description can give so correct an idea of his condition and position as a picture, I therefore had him photographed in the usual position he had occupied for some months.

March 9, 1859. The child being placed fully under the influence of chloroform by Dr. Jones, I divided the tensor-vaginæ-femoris, pectineus, and rectus-femoris muscles subcutaneously, and readily brought the limb in a straight position. Previous to the division of the muscles it was impossible to straighten the limb, pelvis, or spine, even when under the influence of chloroform; any movement of the left leg would move his whole pelvis and body in the same twisted and crooked position in which he is represented in the picture.

In a few minutes after the division of the muscles, by slight extension upon the foot, the spine and pelvis were brought into their natural position, and the leg the same as the other. He was then placed in the "wire breeches" of Dr. Bauer, and extension made by adhesive plaster.

March 10. Slept well all night without opium, the first time in many months. No fever; pulse 80; ate a tolerable breakfast, and is entirely free from pain. He was kept in the wire splint for ten days, when he was removed, and the wounds made by the tenotome were entirely healed, but the least motion of the joint gave him great pain; but his general health was much improved. After thorough washing and friction he was replaced in the wire splint, and extension applied as at first. From this time on he was put on a stimulating and highly nutritious diet, and given iron and cod-liver oil, which were the only medicines he ever used while under my treatment. In a few days he could be carried out to ride in the apparatus without the least inconvenience, and thus get the benefit of fresh air, and improved most rapidly. It is hardly necessary to give the tedious details of daily visits, but suffice it to say

in general terms, that this course was continued until the 10th of June, when he went to the country under the care of his family physician, who continued the same treatment through the summer, taking him from the instrument every eight or ten days and using passive motion, which he thought occurred at the hip-joint, but which, in fact, was obtained by a movement of the whole pelvis. The child's general health improved, and he was carried out daily riding, ate and slept well, and had no pain, and the parents and friends thought him rapidly recovering, and so stated to me in their letters.

In August they wrote me that they feared his joint was stiff; I visited him at Williamsport, Pa., and found his hip-joint quite firmly ankylosed; considerable motion could be made by elevating and depressing the limb, when the pelvis was left free, but as soon as it was firmly secured no motion whatever could be made at the joint, and rotation was impossible. There was no pain whatever about the joint, and he could bear his entire weight upon the leg which seemed to be a trifle longer than the other, owing probably to some organized effusion in the joint, and which rendered locomotion almost impossible, and very awkward. He could not flex the hip so as to sit at all.

I therefore put him fully under the influence of chloroform, and with the assistance of Dr. Pollock, of Williamsport, who firmly held the pelvis, I succeeded in breaking up the bony ankylosis of the hip, which required a good deal of force, and was accompanied with a number of distinct snaps of the breaking bony attachments. Quite free motion was obtained, and he was then placed in the wire splints and cold water applied to the hip, and a large anodyne administered. The cold water with the occasional use of ice, entire rest, low diet, and a relaxed condition of the bowels was continued for about ten days, when all symptoms of inflammation having passed off, the same treatment as before was adopted, viz., removal from the splint and passive motion every few days, *being careful to confine the pelvis* in order to secure the motion *at the hip*.

He returned to the city under my care in November 1859, much improved, but with imperfect motion, and I observed that he always had more or less pain for one or two days after the motion had been applied, which I thought was owing to the fact that I could not keep up *sufficient extension while I was applying the motion*.

This was a desideratum I had tried long to accomplish, but never succeeded to my satisfaction until Dr. H. G. Davis, of this

city, applied to him one of his instruments, which answered the purpose admirably, and in its construction embraced the very principles I had so long sought to obtain.

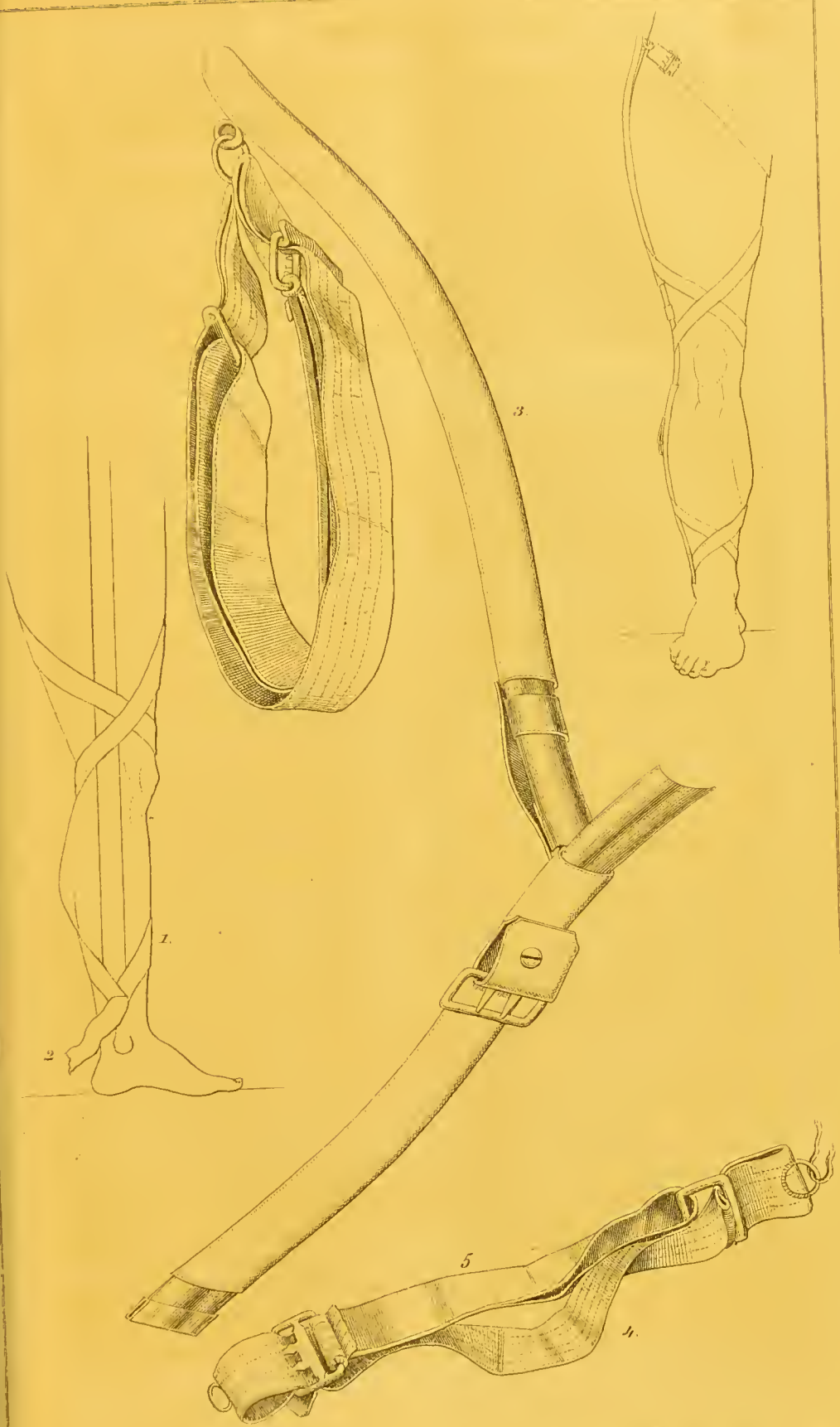
As Dr. Davis is, I believe, the first person who has constructed an instrument embracing these important advantages—extension with motion—I have taken the liberty of presenting a plate of the same, and his own remarks in regard to its method of application. I have made, as I think, some very important improvements and modifications of this instrument, which I will describe more fully hereafter.

DESCRIPTION OF SPLINT.—“The several parts employed in the treatment are four strips of adhesive plaster (see Plate, Fig. 1) ; a roller to confine them to the limb, firm webbing to be attached to the lower end of the adhesive plasters when upon the limb (Fig. 2) ; a cord, pulley, and weight, for extension when upon a bed or couch ; a corrugated steel splint (Fig. 3), with a perineal band, composed of two parts—an inelastic (Fig. 4), and an elastic (Fig. 5)—arranged in a peculiar manner, so as to keep up extension while the patient may take exercise within the house or in the open air.

“When called to treat a case of *morbus coxarius*, I bring the tibia in a line with the femur, but attempt no change in the direction of the latter if it is not parallel with the body. If the femur is flexed upon the pelvis, the body should be raised until the limb will lie extended upon the mattress or couch. Adhesive straps are placed upon each side of the limb, in the following manner: First, double over one inch of each adhesive strap designed for the sides of the limb, bringing the adhesive surfaces in contact for the purpose of increasing the strength of the part, to which a firm inelastic webbing is to be attached. The strip for the outside of the limb commences with the folded end mentioned, at a point one inch above the external malleolus, and extends to the region of the great trochanter ; that upon the inside, from one inch above the internal malleolus to within one inch of the pubis. Upon the lower end of the adhesive strap, on the outside of the limb, I commence with a narrower and longer one, and run it spirally around the limb until it reaches the upper end of the longitudinal straps ; another starts from the same point upon the outside of the limb, but winds in the opposite direction. These spiral strips accomplish a twofold purpose : they connect the outside longitudinal adhesive plaster with that upon the inside of the limb, so that any extension made upon the outside plaster is shared by that upon the inside. This arrangement also secures the bottom of the outside longitudinal plaster from being displaced laterally when the splint is applied, always retaining it in a line with the limb. The width of these plasters varies from an inch and a quarter to two inches and a half, according to the size of the patient.

“When the extension is made by the splint, it is always upon the outside of the limb ; at other times it can be made from both sides ; the latter mode of extension supports the sides of the foot equally, and is therefore preferable when the patient is upon the bed or couch.

“Before proceeding further, I would say a word upon the character of the adhesive plaster to be used for such purposes, as that ordinarily used for dressing



Each of Snyder, Black & Stern 92 William St. N.Y.
H. M. DAVIS' SPLINT FOR HIP DISEASE.
 as Manufactured by Otto & Reynders, 58 Chatham St. New York, since 1855.



wounds will only disappoint the surgeon. It should be spread upon twilled goods as they are more elastic ; and when the extension is made the parts first affected will yield until the whole surface of the plaster bears a portion of the draught ; whereas plaster upon plain cloth draws only in a straight line, therefore is only applicable to an even surface.

"The material of the plaster should not only be good, but it should have been spread upon the cloth for at least one year, and it is still better if two years old ; age oxidizes the oil, rendering it resinous, so that the oily secretions from the skin do not readily soften it. Plaster of this description I have had remain upon an adult for seven months, sustaining a weight of twelve pounds every night, and not unfrequently during the day a considerable portion of the entire weight of the body.

"After the application of the adhesive straps in the manner described, the limb should be covered with a bandage from the foot to the pelvis, to secure firm adhesion of the plasters, also to prevent their edges from being raised by coming in contact with the clothing, or by the hands of the patient during sleep ; this bandage should be affixed to the limb for some hours, with the patient warm in bed, before any draught is made upon the adhesive straps, that they may become firmly adherent to the limb ; after this time has elapsed, a weight, varying from two to six pounds, according to strength of muscle and the sensibility of the joint, may be attached to the adhesive straps upon each side of the limb by a cord that runs over a small pulley secured to the foot of the bed or couch ; the top of the pulley being a little above a line with the centre of the limb. This weight should be increased from day to day, until a general sensation of fatigue is felt in the entire limb to an unpleasant extent, and then diminished until it just falls short of this point. The extension is first made at that angle with the body that I find the limb, as the tenderness of the joint subsides the body should gradually be lowered until it is brought in a line with the limb ; when this is effected the splint is applied, and the patient put upon crutches and permitted to exercise."¹

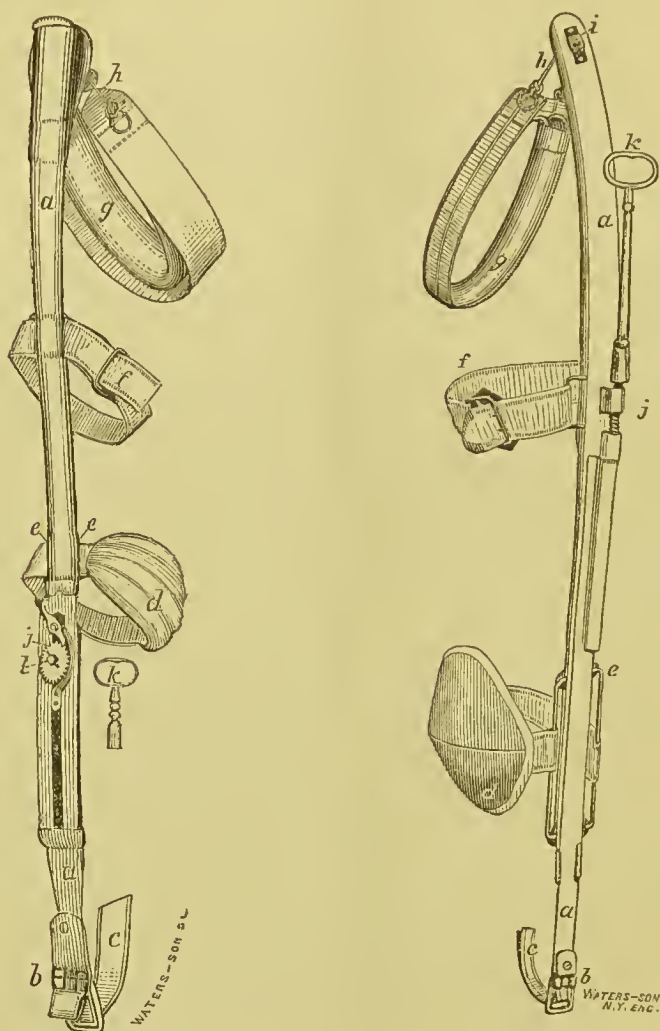
This instrument of Dr. Davis was applied in this case with the happiest results for a few days, but it soon began to excoriate the groin, and the method of extension was not satisfactory, and could not be controlled at will ; but would be either too feeble or too severe, and I therefore constructed an instrument embracing all the principles in this, but much more effectual in its application, more comfortable to the patient, and entirely under the control of the surgeon.

It consists of a narrow steel splint, extending from just above the crest of the ilium to within two or three inches of the external malleolus, and is divided into two parts at the knee, so that one runs into or by the side of the other, and is capable of being extended at will by a ratchet and cog-wheel near the knee, which is worked by a key, or the same extension may be made by means of a screw, which will run more smoothly than the ratchet and cog-

¹ From Am. Med. Monthly, for April, 1860.

wheel, and be less expensive; but is not quite so easy of application and removal.

Fig. 10.



The upper portion of the instrument is corrugated to increase its strength, and in the groove at its upper extremity is a ball and socket or universal joint, to which is attached a pulley or wheel, for the counter extending catgut cord to play through. This catgut is attached at either end of the perineal or counter-extending belt, which is made of thick India rubber tubing, and being firmly secured at either end, makes an elastic and comfortable air cushion for the perineum, and will not excoriate or chafe the parts.

At the lower end of the instrument is a small roller, extending nearly its entire width, and just above it a buckle for the purpose

of securing the firm webbing or strap, which plays over the roller at the lower end of the instrument and is sewed fast to the strong adhesive plaster for the purpose of making extension. The adhesive plaster is spread on very firm canton flannel or twilled cloth, and the older it is the better, as it is less likely to irritate the skin. The plaster is cut two or three inches wide according to the size of the limb, and commences from about two or three inches above the external malleolus, and extends to within a few inches of the trochanter major. Two other and longer strips go around the limb in a spiral manner in opposite directions, commencing from the lower end of the first or longitudinal strip and extending upwards. The plaster is very smoothly adjusted, and then well secured by a carefully applied roller from the toes upward embracing the entire limb, and taking three or four turns around the body in the form of figure of 8.

After the plaster has been applied a few hours, and becomes well set to the skin so that it will not slide, the instrument is applied, and extension made by the key at the cog-wheel. This is made slight at first, and as the muscles become fatigued and relaxed, it is gradually increased, and continued until the patient can bear quite firm pressure against the heel without producing pain at the hip.

The perineum becomes accustomed to the pressure in a few days if it is not too severely applied at first, and the patients begin to run around with ease and comfort, after which it is impossible to persuade them to abandon it, even for some time after they are entirely cured. At least this has been my experience.

If the patients are young and of light weight, I let them go about without crutches; but if they are heavy and I fear the plaster will not bear their weight, I make them use them as a protection.

This instrument was applied to this case about the middle of December, 1859, and he wore it constantly until the 1st of March, when he walked to Mr. Guerney's gallery and had his photograph taken, which is engraved in Fig. 8, and which gives a better idea of his present condition than I can do by description; I have placed it beside the one taken a year before for comparison.

It will be observed that there is an unnatural fulness about the upper part of the thigh. This is doubtless owing to the division of the tensor vaginæ femoris, rectus and pectineus muscles, which I had performed in the first operation.

He left for his home in Pennsylvania early in March, and I have not seen him since; but I have just received a letter from his

father, dated Williamsport, June 4th, 1860, in which he says: "He has grown wonderfully, his general health is perfect, his appetite good, sleeps soundly all night, and his flesh is as sound and hard on his lame leg as on the other, and he never complains of any pain. The only thing that I observe is an appearance of stiffness of the lame leg, particularly when the instrument is on, but which is not apparent when the instrument is off.¹ His figure is quite good, but his hip bulges outward, and always looks as if it was swelled; but there is no pain in it whatever." This apparent fullness of the hip and upper part of the thigh I have already explained to be dependent, as I think, upon the division of the muscles. There may be also some deposition in the joint which presses the femur more outward than natural, as it will be remembered it had once been anehylosed and had to be broken up. This ease is now well, and I have no doubt the instrument may be left off with perfect safety; I have written to them to that effect. I do not know of any other treatment that would have given him so good a result. I certainly have never seen any that would at all compare with it, and as, in the course of the treatment, many of the principles which I have been anxious to inculcate were compelled to be put in practice, I have, therefore, written out the case in full, as it will illustrate my views better than any other way I could do it.

Morbus Coxarius, 2d stage—treated by division of muscles; perfect rest in wire splint of Dr. Bauer, and afterwards passive motion; recovery. Disease returned, same treatment, partial ankylosis—broken up and recovery with tolerable motion.

Henry W. Hunt, aged ten years, of good constitution, though not robust, was observed to walk lame on the right side for the first time in September, 1856. No reason could be assigned for the lameness.

When he came under my observation in the latter part of Sept. 1856, the symptoms of hip-joint were recognized. The foot was everted, knee flexed, natis flattened. An issue had been made and a sole-leather splint applied, and the patient was ordered to use crutches, and means were instituted to invigorate the constitution. His general health improved, but the local disease continued in the

¹ This apparent stiffness is due to the immobility of the knee which is caused by the instrument.

same condition. My engagements not permitting me to bestow the attention the case demanded, I advised the parents to place the patient under the charge of Dr. Louis Bauer, in his private orthopædic institution in Brooklyn. It was accordingly done about Christmas, 1856.

The treatment adopted was that usually followed by Dr. Bauer, viz., complete rest with extension, obtained by means of the "wire-splint," and appropriate regimen and nutritious diet.

Under this treatment his symptoms rapidly improved, and in December, 1857, he returned home in perfect health, walking and running with ease, without pain, but the motions of the joint were always limited, and seemed to be checked suddenly as if there was some bony effusion about the joint. He continued well during that and the following year, going to school and playing with other children without any perceptible limp; but on the 22d of Feb., 1859, while sliding on the ice, his legs becoming more widely stretched apart than ordinary, he must have broken up some of the attachments that had formed around the hip-joint; for a few minutes he felt severe pain in the hip, but soon resumed his sports, and continued on the ice for some hours. In the middle of the night, however, he complained of pain in the right knee, which came on very suddenly, and, as he thought, without any apparent exciting cause. The pain increasing, I was summoned to see him on the 24th of Feb., when the following condition of things was noted.

He was suffering acute pain in knee and thigh. Pain in knee constant, more severe at times, and greatly increased by the slightest movement of the joint. He had had fever; pulse over 90. No sleep for two nights.

Anteriorly.—On assuming the erect posture, the affected limb was thrown forward, everted and abducted; knee slightly flexed; pelvis inclined downward on that side, so that the anterior superior spinous process of the right side was an inch lower than the opposite side. The pectineus, gracilis, tensor vaginæ femoris, sartorius and rectus muscles were rigidly contracted, so that any attempt to move the thigh on the pelvis caused motion of the whole pelvis, as if complete ankylosis existed.

Posteriorly.—Same obliquity of pelvis prominent, and marked flatness on right side; distance from median line to trochanter greater than the opposite side; rima natis half an inch lower.

Leeches to the inflamed joint were ordered, anodynes and entire

rest. He was by these means partially relieved. On Sunday, the 27th of Feb., assisted by Dr. L. Bauer and Dr. E. Lee Jones, chloroform having been administered, the patient was placed in the "wire splint," and the sound leg being firmly bandaged to the splint, the pectineus, gracilis, tensor vaginæ femoris, and rectus muscles were divided, with the immediate effect of restoring the limb to its natural length, and the pelvis to its proper relations. It is worthy of note that, though under the full influence of chloroform, the semi-anchylosed condition of the pelvis was not in the smallest degree relaxed before the division of the muscles.

He passed a comfortable night, feeling but little pain and some inconvenience from the constrained position. He was ordered nourishing diet. He continued to improve in every respect until the 31st of March, when he was taken with a fever, loss of appetite, and headache, which was probably induced by indulging his appetite too freely. This unfavorable state subsided in ten days. From this time nothing untoward happened; his condition rapidly improved generally and locally; he increased in flesh. His limb was dressed every fourth or fifth day, passive motion being used at each dressing. Once or twice a week he was taken out to ride. On the 27th of June the splint was removed, and he was permitted to go about on his crutches; but by over-exercise the pain and lameness returned, and he was placed in the "wire breeches" again on the 23d of July. He was removed from the same every six to eight days, washed, rubbed, and passive motion applied. This plan was continued until the 2d of September, when, although the pain had entirely ceased, the motions of the joint were very limited, and restricted so suddenly in certain movements as to indicate pretty firm adhesions. He was put fully under the influence of chloroform, and these adhesions broken up with a very decided snap that could be heard all over the room, and required considerable force to accomplish. He was then replaced in the "wire breeches," and pretty firm extension applied, and *entire rest*, with cold water over the joint for some days, when all symptoms of local inflammation had subsided; the treatment was then continued the same as before, only being more careful when applying the passive motion, to have an *assistant hold the pelvis immovable, and at the same time the motion was made, firm extension was kept up* by the person having hold of the foot. This is a most important point in practice, and frequently overlooked even by good surgeons and very careful observers. I am satisfied that I myself have not been as careful in many of my

former cases to observe this principle, as I should have been. And if we trust the dressing to the family or careless assistants, they will certainly be deceived when they are applying motion, and obtain it from the pelvis when they think they are moving the hip.

This is one of the objections to the plan of treatment suggested by Dr. March and Dr. Bauer, by fixed splints in the recumbent posture, for, although you relieve the pain by constant extension, yet unless you are careful in frequently applying passive motion, and that done in a proper manner, you will cure your case by *anchylosis*. And this, when done in the *straight* position, is infinitely worse than when the case has been left to the unaided efforts of nature, as formerly suggested by Dr. Carnochan, for then the limb is flexed at such an angle as to render it much more useful than when entirely straight, as it will permit the patient to sit, and at the same time give him much more freedom of motion.

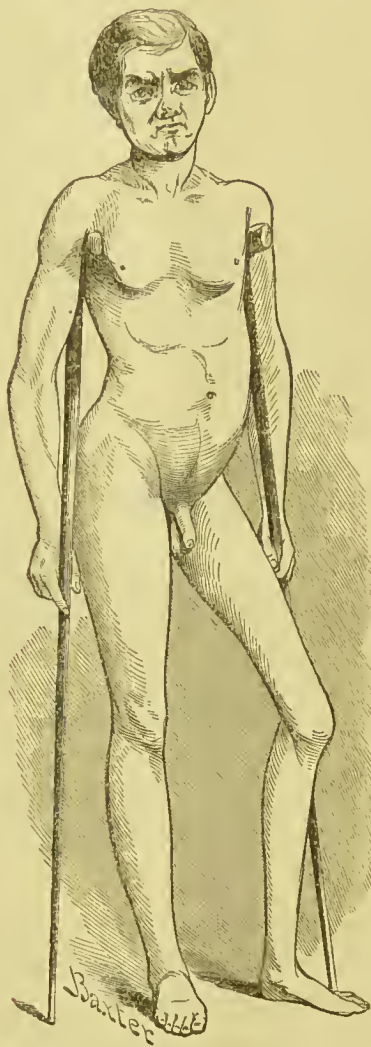
This treatment was continued until about the middle of January, when I found that he could bear pressure without pain, had quite free motion of the limb, but not perfect, and as his general health was good, and no tenderness whatever about the joint, he was permitted to go about on crutches. These he used for about six weeks, since when he runs and uses his limb quite freely, and has had no further trouble. June 27th, 1860, I saw young Hunt to-day, and found him in perfect health, walking freely without crutches, and no symptoms of any return of the disease. He cannot flex, or rotate the limb as freely as the other; but walks and runs without any limp.

Morbus Coxarius, 2d stage—treated without division of muscles with my splint, permitting exercise and motion, while it keeps up extension. Recovery perfect.

S. M., aged 14 (whose father has had ankylosis of his left knee for many years as the result of a strumous synovitis, and has also had exfoliation of a portion of his clavicle from necrosis), came under treatment in November, 1859, with morbus coxarius of the left hip in the 2d stage. The limb was apparently longer, abducted, everted, flexed in the knee and hip; pelvis lowered on the left side, and projecting forward; natis lower than the opposite side, and flat; muscles around the affected joint rigidly contracted, permitting no motion of the joint, and giving it the appearance of ankylosis; when the pelvis was firmly held, flexion and rotation of the limb caused great pain, and the least pressure on the limb, so

as to bring the head of the femur against the acetabulum, produced the most intense agony. The limb was much smaller than the other, and his general health was much broken down; no appetite, and but little sleep without opiates.

Fig. 11.



S. K. M. MORBUS COXARIUS, SECOND STAGE. NOV., 1859.

Previous History.—In examining for the cause of this disease, I was informed there was none, that it came on without any cause eight or nine months since, and was now growing rapidly worse. This is the usual history of almost all cases; but being satisfied that there is in a great majority of cases, if not in all, a certain fixed point of departure from the healthy state, to which the disease can

be traced, if we are only careful enough to hunt up the evidence, I, therefore, interrogated him more thoroughly, and discovered that he had been struck with a stone over the joint more than two years before, which caused him great pain at the time, causing him to stop his play for some hours, and made him quite lame for a few days; but by limiting the amount of exercise, it all passed off in a few days, and he had quite forgotten the occurrence. He now, however, remembered distinctly that ever since that time he had always suffered in his hip whenever he had taken any very severe exercise, and mentioned several instances when he had been skating, playing football, jumping, and once after running a race. After all these, several times he had been compelled to keep quiet for some days, and was for a long time quite stiff in his hip every morning, and could not stand on it as well as the other. All of these circumstances he had nearly forgotten, and did not think they had anything to do with his present condition; but had been attributable to the fact of his rapid growth, and had, therefore, been called by his family "growing pains," and no attention was therefore paid to them.

I have been thus particular in writing out this case, because it is, according to my experience, almost a type of the generality of cases of this disease, when it occurs in a tolerably good constitution. It is generally, as I have before stated, a synovitis more or less severe, and attributable to some distinct exciting cause; and if it occur in a *perfectly* healthy child, will pass off in a few days by the rest which he voluntarily gives it, without being noticed. If it occur in a constitution similar to this young lad, it will generally give a similar history, and if it happens in a strongly tainted strumous child, it will be much more rapidly developed and disastrous in its consequences. But in either instance, whether recent or of long standing, I have always been able to trace it to an exciting cause.

Treatment.—I applied six leeches around the joint, and then kept it enveloped in cloths constantly wet with very cold water for a few days, until the more violent inflammatory symptoms had subsided, during which time he was kept perfectly quiet in bed, and his limb slightly but *constantly extended* by means of a weight and pulley over the foot of the bed and attached to the leg by means of adhesive plaster. During this time, I think the leeches were re-applied once or twice.

On the third of December, 1859, I put on my splint, and applied

as much extension as he could bear without pain in the groin, and gradually increased it a notch or two at a time every few hours, until the limb and body were brought in a perfectly straight line, and the twist in the pelvis entirely disappeared. This occupied about two days. The last day, the instrument was extended but little, the object having been nearly accomplished within a few hours after the extension was first applied. From the very hour of its application his pain was relieved, he slept well all night without any pain, and without the use of opiates, which he had not done before for months, and in a few days his appetite was perfectly restored, and was gratified and encouraged by the most nutritious and palatable diet I could suggest, and aided by the use of ale and other stimulants.

The instrument was removed at night, and extension was kept up by a weight and pulley for a short time; but he soon discovered that he was more comfortable in the instrument, and, therefore, wore it all the time, night and day. This has been the testimony of every case in which I have used it, and I have now abandoned the weight and pulley altogether, as I find by the use of the India rubber tubular air cushion, there is no danger of excoriating the groin.

He was walking about in three days after the application of the splint, and has continued to do so all the time.

The bandage has been renewed once a week, and the knee well moved at each dressing. In February a chronic or cold abscess was discovered between the scapulæ, which gave him much annoyance and destroyed his appetite; it was opened, but lasted some weeks, and eventually healed by the use of iodine and pressure. Whether this was metastatic or not I am unable to say; but coincident with its appearance, all the distension and fulness about the hip-joint disappeared. No internal remedies were used but cod-liver oil and iron. Whenever the instrument was on and extension applied, he was comfortable, free from pain, could walk with ease, and had free motion of the joint. When the extension was removed, he could not bear any weight upon the limb, and motion gave him pain.¹

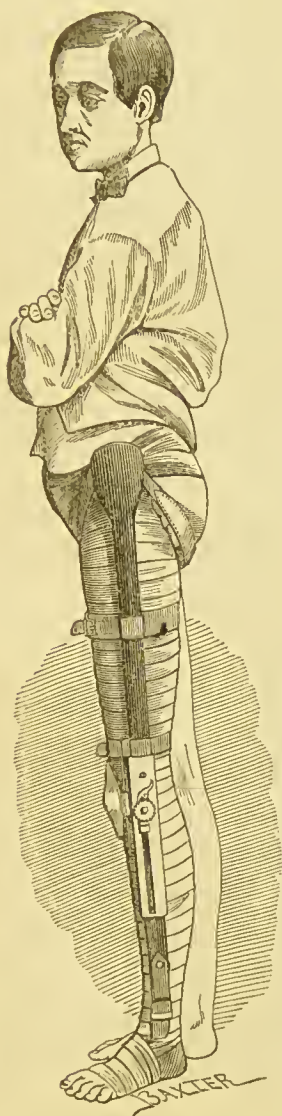
¹ *July 10, 1860*, walked to my office and had a photograph taken by Mead, from which the annexed plate was engraved, which gives a better idea of the result of the treatment than I can do by description. (See Fig. 12.) Can walk several miles without crutches, go up and down stairs with perfect ease, has no pain whatever in the joint on pressure or motion, has perfect motion of the same, and is in

Morbus Coxarius, 2d stage—treated by division of contracted muscles—and extension in wire splint of Dr. Bauer; recovery. Return of disease and treated in my splint, permitting motion and exercise.

George Brough, native of England, five years old, as far as can be ascertained, had enjoyed good health until May, 1858, when he

all respects healthy. The leg is still much smaller than the other, and I have directed him to use the splint for some months still as a precaution, as he is going

Fig. 12.



S. K. M., WITH INSTRUMENT APPLIED.

Fig. 13.



PHOTOGRAPHIC VIEW, WITH INSTRUMENT REMOVED.

arrived in New York, to reside with his adopted parents. At that time they observed that the right leg was longer, and the knee swollen and bound with a piece of red flannel, which the little patient stated had been put on by his grandmother previous to leaving England, and he had also been blistered on the knee. At times the pain in the knee was so severe as to prevent his foot touching the ground. It was noticed that in standing or walking he would always favor the right limb.

This condition of things continued with but slight variation in the symptoms until *Sunday, Feb. 13, 1859*, when, for the first time, without any apparent cause, he experienced pain in the right hip, of a character so severe as to confine him to bed the greater portion of the time.

On *Wednesday, Feb. 16th*, he first came under my observation, when, on examination, the following state of things was found:—

Present Condition.—Standing (see Fig. 3, page 478), would bear entire weight on left leg, the right (affected) limb thrown forward, everted, abducted, and knee slightly flexed, anterior superior spinous process of right side one-half to one inch lower than left. Posterior aspect, pelvis presented same obliquity, right natis flattened, the distance from mesial line to the trochanter major of right side greater than left side, the rima natis lower on right side. Pressure over trochanter major, on the knee or bottom of the foot, produced pain in the hip-joint. Adduction almost impossible, and the attempt produced pain. The muscles connecting the hip and thigh rigid and firmly contracted, producing the effect almost of bony ankylosis. Flexion and rotation of opposite limb perfect.

to the country for a month or two to hunt and fish. I have no doubt that the muscles of the thigh and leg will become developed again as soon as the roller is removed, and they are permitted free use again.

I have given this case in full, because it was the first case I treated on this plan of *motion with the extension*, and the result has been infinitely more satisfactory than when I treated them by *perfect rest*, with extension in the straight splint, as I formerly did. I have many more cases now which are almost exact duplicates of this, with the exception of the cold abscess, and it is, therefore, unnecessary to detail them, as one is just as good to illustrate the principles as a thousand.

The plate (Fig. 11) shows his condition at the time of the application of the instrument in Nov. 1859, and Fig. 12 is a photograph by Mead, of the same case July 10th, 1860, with the instrument still on him. Fig. 13 is a photographic front view of the same case, with the instrument removed. It will be observed that the thigh is still much smaller than the other; but the form is perfectly restored, and he bears his entire weight without pain, and has perfect motion.

He was pale and emaciated in consequence of want of sleep and suffering.

Operation.—On 16th of Feb., in presence of Dr. E. Lee Jones and Dr. Phelps, of Bellevue Hospital, while under the influence of chloroform, I divided the tensor vaginæ femoris, sartorius, gracilis, and pectineus muscles, when the pelvis assumed its natural position, and the movements of the joint were perfectly free. No crepitus detected. He was then placed in the wire splint of Dr. Bauer, and both limbs and pelvis firmly confined by bandages. The knee of the affected side was slightly flexed; the foot everted, due to the action of the rectus muscle, which had not been divided; this was obviated by a compress and firm bandaging. On the night of the operation he was compelled to have a small quantity of morphine to relieve pain. He continued to suffer considerably, crying out with pain in the knee, until Sunday, the 27th, when, by bending the body forward, thus relaxing the rectus muscle, he was entirely relieved. Discovering this fact, I divided the rectus muscle, and he has remained in a comfortable state up to present time, March 7. Appetite good; spirits cheerful.

March 15. Removed splint; passive motion; reapplied apparatus; everything continues progressing favorably.

May 10. Continues to improve; when out of the splint he can elevate the leg to a right angle, turn the foot outwards and inwards with ease. Pressure of the head of the femur against the acetabulum occasions no pain. He has since improved in his general health; his appetite good, bowels regular, weight increased. Every second or third night the limb is taken out of the splint, which is not applied until the next morning. No inconvenience is experienced.

29th. Removed apparatus, and the little patient went to church.

June 4. He was allowed to go to the country to visit his friends. Getting out of the cars he twisted his leg, which the next day gave evidence of pain when walking. Ten days after he returned to the city, suffering a good deal from tenderness of the joint. The pain was relieved by a small blister. A few days after the splint was again applied.

21st. Everything is now progressing favorably.

August 9. Removed the instrument, and applied passive motion. No pain; appetite good, and sleeps well; bears pressure of the femur against the acetabulum without pain; legs of the same length, and pelvis straight.

Feb. 11, 1860. This little patient was again sent to me from the country, where he had removed in August last, with all his symptoms as bad as when I first saw him. The mother stated that he had been well all the summer and fall, and, fearing that his leg would get stiff, she left off the use of the instrument early in November, and after a few days he could run as well as any of the children;

Fig. 14.



but in the course of a few weeks, as the cold weather came on, she observed he would be slightly lame after any severe exercise.

One day he hurt his hip while sliding on the ice, and from that time grew rapidly worse, lost his appetite and sleep, suffered great pain at night, requiring opiates, and was becoming so much emaciated that she removed with him into the city. I found him with all the symptoms of hip-disease in the second stage; but instead of again dividing the muscles, I put upon him my splint for permanent extension, which also admits of motion, and his deformity was almost immediately removed, and he could walk with perfect ease, without the use of crutches. (See Fig. 14, which was taken by Gurney in less than half an hour after Fig. 3, page 478, with which the reader is requested to compare it. A longer time should have elapsed after the application of the instrument, before the picture was taken, when the deformity would have been more materially relieved, as in Fig. 12.)

March 27. Mrs. Brough again brought her boy to me to-day, to have the bandages removed, as they had become very much soiled. When I censured her for neglecting to bring me the case more frequently, she replied, that he got so much better and slept so perfectly comfortable, the first night after the instrument was applied, that she did not think it necessary, and that he improved so much in a few days, that she concluded to return with him to the country; and that he had been running around and enjoying himself all the time; ate and slept well, and that she only now came down because he needed a clean bandage. The instrument had not been removed since its first application, early in February. She had twice turned the key and extended the limb a trifle, and had by that means relieved all his pain. To my surprise, on removing the instrument, there was no chafing or excoriation in the groin, or other abrasion of the skin in any place. The bandages were renewed, and he returned to the country with instructions to return once a week.

May 25. I have seen little Brough weekly since last report, and find him constantly improving; has grown quite stout, and his general health is perfectly good. The limbs are nearly the same length, and he can bear his weight upon the diseased limb without pain, when the instrument is on; but gives a slight halt when he attempts to walk without it. This case I feel satisfied will progress to a favorable recovery, but as the disease has a great tendency to return, I shall let him wear the instrument for some months even after he has entirely recovered, as a matter of precaution. And this is the great advantage of this plan of treatment over that I formerly adopted, that it permits free exercise, and the child can enjoy

all his out-door sports, running simply with his knee stiffened by the splint, which he soon learns how to accommodate himself to.

Case of Hip-disease, 2d stage—puncturing of the joint for excessive sero-purulent effusion—gradual and perfect recovery.¹

Mary Corbitt, aged five years and nine months, well developed, and rather of robust frame, though pale and sickly looking when taken in charge on the 4th of June, 1857. Parents healthy, and no trace of tuberculosis in the divers lineage of their ancestors.

The patient had sustained a severe fall from the lower steps of a staircase directly upon the left hip-joint; pain immediately ensued, but gradually subsided again so as to leave the patient comfortable and ease in locomotion. Months after that accident had elapsed, before the little girl manifested any symptoms of uneasiness and febrile disturbance, she showed very little disposition to walk, was easily tired, and would lean upon objects for support, on account of her weakness. In fact, the accident had been entirely forgotten. A physician being called in, pronounced the difficulty of a gastric character, advising gentle purgatives and restricted diet. But this course of treatment brought no relief; on the contrary, the child grew worse, became more pallid, lost flesh, passed very uneasy nights, refused food, and drank much water. In this way the disease continued for weeks and months, the patient pining away, when on dressing her, it was noticed that her frame had become seriously distorted, the left extremity rather elongated, its toes everted, and that the left hip-joint had assumed a peculiar shape. Moreover, and for the first time, pain was discovered in that joint.

At this juncture, another physician was consulted, who pronounced the disease "coxalgia," established issues in the neighborhood of the affected joint, prescribed cod-liver oil, generous diet, and to be carried or driven about in the open air, with the exclusion of active exercise.

For a few days the treatment seemed to be beneficial; the little patient looked more cheerful and contented; appetite improved slightly, and enjoyed better sleep. But this improvement proved itself of no duration. Again signs of fever and general discomfort rose, and with them more pain in and about the affected joint set in. The child was tortured with excruciating nocturnal pains,

¹ For the notes of this case, I am indebted to my friend Dr. Bauer.

which threw her into profuse perspiration; although to all appearance sound asleep, she would cry out every few minutes, raising herself into the sitting posture and sink quietly back again in order to be painfully aroused in the same way: this would occur repeatedly every night.

When the disease had advanced to this stage, the patient was placed under my charge. In addition to all the symptoms already described, the patient presented, on more close examination, the following morbid appearances.

"Left extremity apparently elongated, abducted, and besides everted; slightly bent in hip and knee-joint; pelvis projecting and inclining downward on that side; natis flat, left buttock below the right;" linea internates oblique towards left; spine thrown out of its perpendicular, single curvature with its convexity to the left. Pain on moving the left extremity, which is slightly attenuated; immobility of the left hip-joint, all motions being produced by the pelvis on the opposite hip articulation. But when quickly moved allows a slight degree of flexion and extension, but no particle of *adduction*. The joint *highly tender on concussion* of the thigh, but *relieved on extension*. By pressing upon the circumference of the affected joint, besides great tenderness, there is a sort of round puffy fold which evidently fluctuates. Otherwise there is no diffuse fluctuation anywhere, but some oedematous swelling around the joint.

On examining the pelvic cavity per rectum, there is no perforation or thickening of the tissues about the acetabulum. The subsequent examination of the joint and its environs under chloroform, gave no other results than those mentioned.

As to the nature and advancement of the disease there could be no doubt, and it was therefore set down as "traumatic morbus coxarius," with considerable effusion of most probably a sero-purulent character. State of the articular surfaces dubious, and its diagnosis deferred.

After three days' preparatory treatment, the patient was brought under the influence of chloroform and the left hip-joint punctured by means of a fine trocar, when about six drachms of sero-purulent liquid was discharged through the canula, whereupon the joint was surrounded with adhesive strips and the patient subsequently placed into the well lined "wire breeches."

During the ensuing fourteen days the patient was completely relieved, the local as well as the general symptoms positively

silenced. It was indeed wonderful to notice the rapidly returning signs of health under the ease and comfort of the condition thus secured.

But this improvement was not of long duration, for in about two weeks after the operation the joint had gradually filled again, the limb had reassumed the previously described malposition, and the local and general symptoms had again become aggravated. Under these circumstances it was decided upon to withdraw once more the articular contents, which I did by a subcutaneous incision into the joint, according to the method of Goyrand. But from a few drops of the articular effusion escaping from the wound incidentally, its purulent serous composition was noticed.

This second operation was performed with the same immediate beneficial effects, the pain was relieved instantly, the limb could be brought into any position, and no crepitus was noticed on this occasion, hence it was inferred that we had to deal with purulent synovitis only.

From this time to the ultimate discharge of the patient in November following, the patient progressed favorably, the treatment having been the same as I have described in the other cases.

Two years after I saw her again, and I exhibited her to quite a number of physicians. The limb had then acquired almost perfect position, and the joint a moderate freedom of motion.

Evidently some fibrous adhesion had formed restricting perfect motion, but I did not deem it prudent to break them up at that period, apprehending recurrence of the disease. This, however, will be done at a future occasion if opportunity is offered.

Her general health was perfect.

Case.—Morbus Coxarius, six months' duration; used splint three months; recovery without deformity, and motion perfect.

W. P., aged seven, fell down a flight of stairs in fall of 1859. Had some pain in hip and back for a few days, but was not confined to his bed, and after a short time ceased to complain of any pain, until Dec., when he began to complain of his left knee, and was slightly lame every morning. These difficulties increased, until he was confined to his bed in Jan. 1860, and suffered much from spasms every night. His limb became much contracted at the knee and hip, and was intensely painful, upon any attempt at motion. These symptoms grew more and more severe, until I was

called to see him the 1st of March, 1860. I found him on his back, with his leg on a pillow, and slightly everted and abducted. Any attempt at flexion or adduction gave him great pain, as also did pressure on the trochanter, or against the heel. There was an eruption on the knee and lower portion of the thigh, like eczema; but whether it was from the treatment he had received or not, I was unable to say. It was a well-marked case of hip-disease, far advanced towards the second stage, complicated with eczema of that limb. I applied lapis caliminaris to the limb, and extension by means of a weight and pulley, and put him on the use of cod-liver oil and iron, internally. In about ten days Dr. Parker saw him in consultation with me, and I applied my splint, and put on moderate extension, when he was relieved of his pain immediately. In about two weeks he was running around the streets, with the instrument on, without the use of any crutches, and his general health improved most rapidly. The bandages had to be removed about twice a week, for the first month, on account of the eczema, but after that only once in eight or ten days. The plaster was never reapplied but once during the treatment.

He wore the instrument constantly until the 1st of June, when he was completely cured, and had every motion of the joint perfect. The limb was somewhat smaller than the other; but there was no pain whatever on pressure around the joint.¹

Exsection of the head of the femur and removal of the upper rim of the acetabulum for morbus coxarius.

On the 20th of March, 1854, I was called, in consultation with Dr. Throckmorton, to see Ellen G., 297 Fifth Street, aged 9 years, who had been suffering for 18 months with morbus coxarius of the left hip, which was supposed to have resulted from a fall. She had been treated with issues, blisters, etc., together with the general tonics, and anti-scrofulous remedies adapted to such cases; but the disease continued to progress, until an abscess was discovered, involving the whole upper front and inner portion of the thigh, accompanied with repeated chills, profuse sweats, and great prostration.

When I first saw her, this abscess had pointed in two places,

¹ Nov. 1860. This little patient remains in perfect health, and his limb has grown nearly as large as the other. This case is a fair type of many that I have treated in the same way since.

and apparently just ready to open; the point nearest the surface and most fluctuating was just by the anterior superior spinous process of the ilium, immediately in contact with the attachment of the tensor vaginæ femoris muscle, and Poupart's ligament. The other place of pointing was about five inches below the ligament, just over the femoral artery; pressure on any part of the upper portion of the limb distended both of these pointing abscesses, showing communication between them.

The leg was shortened $2\frac{1}{4}$ inches, and turned inward, *but not permanently fixed in its position* (as is usual), but allowing of considerable motion, which gave a distinct *bony crepitus* between the femur and ilium. The pelvis was twisted and drawn upwards. Her general health had become much affected, having lost her appetite, and she was suffering from hectic, with constant chills and profuse sweats, and was only rendered comfortable by the constant use of anodynes.

I advised a free opening of the abscess, and, if necessary, to remove the head of the femur. At first this was objected to; but, as the child's health rapidly failed and death seemed inevitable, the father, in a few days, consented to the operation. Accordingly, on the 29th of March, 1854, assisted by Drs. Throckmorton, Drake, Thebaud, Bauer, and Bertholf, I proceeded to perform it.

I first laid open the abscess by a free incision of about six inches, over the trochanter major, on the outer aspect of the thigh, and in a line with the femur, and then cut into the floor of the abscess (which principally occupied the inner and front portion of the thigh), and discharged about a pint of thin serous and flaky pus. The finger was then readily passed around the neck of the femur, and detected an opening in the capsular ligament on the inner surface of the neck. The upper border of the acetabulum had been absorbed, and the head of the femur was upon the dorsum of the ilium, near the anterior superior spinous process, *surrounded by its capsule* (which seemed to have been slipped up), and a large deposit of bone, apparently being an attempt of Nature to make a new acetabulum. But this cavity thus formed had no lining membrane, as the femur grated roughly upon it. I then opened the capsular ligament on a line with the external incision, and disarticulated by bringing the leg strongly across the opposite thigh, and then, with a large pair of Lucr's forceps, readily cut off the head of the femur at the lower extremity of the neck. The bone at this point appeared perfectly healthy. I was very cautious not to injure the

insertion of the psoas-magnus, or iliacus-internus, or any of the rotator muscles, which are inserted just behind the trochanter major.

The upper rim of the acetabulum had been absorbed (according to the theory of Dr. March, of Albany), and the new deposit of bone, which was intended to supply its place, was denuded and carious. I gouged it off with a sharp, firm chisel made for that purpose, and, in this way, took off a number of flakes of bone, until I came to a healthy, bleeding surface.

The anterior superior spinous process on its outer surface, and the external lip of the crest of the ilium, was black and carious for some distance, and with the forceps I easily clipped it off until I came to healthy bone. Very little blood was lost in the operation, and after cleaning away all the debris, I brought the leg in the straight position, filled the wound with lint, and dressed with a roller and cold water compress. She was then put to bed, and a cup of strong coffee administered, after which she soon fell asleep.

The child was under the influence of chloroform during the operation, which occupied nearly 20 minutes, and was perfectly insensible the whole time.

The following extracts from my note-book, taken at each daily visit, exhibit the progress of the case:—

11 P. M. Has slept occasionally and is quite comfortable; pulse 128; skin good; vomited freely about 4 P. M.

March 30, 10 A. M. Passed a good night, without any narcotic, and slept about four hours; has had no chill; taken breakfast with a relish, and is surprisingly comfortable, considering the magnitude of the operation; pulse 120; no hemorrhage; passed urine twice.

31st. Took half a grain of opium last night; slept well; pulse 120; skin good; removed external layer of lint; found small amount of pus.

April 1. Slight fever; heat of skin and thirst; pulse 130. Administered 5 gr. Dover's powder, with addition of half a grain ipecac., every four hours.

2^d. Has passed a good night, slept six hours, ate a good breakfast, and feels every way better, but is much more feeble; dressed the wound; on removing the lint found healthy pus in abundance.

The abscess, which pointed at the anterior superior spinous process, being again full and fluctuating, I opened it, and gave exit to about a tablespoonful of tolerably healthy pus; pulse 140, and more

feeble; directed to administer brandy and beef-tea liberally. I do not think the family give sufficient stimulant or nourishment, as they are very strongly opposed to brandy, and are afraid of meat on account of fever.

3d. Slept well all night without opiate; pulse 120; bowels moved twice naturally; appetite good; finding great improvement follow a more nutritious diet, I advised its continuance.

4th. Same as yesterday; healthy suppuration rather abundant.

5th. Child very comfortable, amusing herself by cutting paper dolls; applied the straight splint for counter-extension to the well side, and made extension by means of the foot-board, bringing the limb down to the same length of the opposite one.

6th. Slept well; bowels moved naturally; but pulse more quick and feeble, 160; has not eaten so well; ordered brandy and soup to be given more liberally.

7th. Slept well, but much weaker, having had three loose discharges in the night, and some hemorrhage from the nose, which was arrested by astringents and compress. Ordered brandy and laudanum, with liberal use of iron.

8th. Diarrhoea not yet checked; the brandy and opium were not given, and yet the child is somewhat stronger than yesterday; pus more consistent.

9th. Diarrhoea checked; slept well; eats freely; discharge less copious and more consistent; pulse 120.

10th. Very comfortable; looks as if it will require a counter-opening on the front of the thigh, at the old place of pointing.

13th. Doing well, and the wound filling with healthy granulations.

14th. I applied a compress and adhesive straps on the inside of the thigh.

July 1. Dr. Throekmorton has seen the child daily since my last visit, and reapplied the bandage and compress, which has had a most salutary effect, and the abscess has the appearance of healing rapidly.

10th. I was again called to meet Dr. T. to-day, and found the child much prostrated from a severe attack of dysentery, which had lasted four or five days; she is very much reduced, and I fear will not rally. The granulations are flabby, and pus thin and copious.

August 1. The dysentery has been checked for some days; but the wound, which was nearly closed, has opened, and a small piece of ragged bone came away, which was probably some portion of

the shavings or chips removed from the ilium at the time of the operation, and which I had not been sufficiently careful to remove.¹

20th. The child very much improved, but the fistulous opening, from which the piece of bone had escaped, remaining, and having rather a white and flabby appearance, I injected it with tincture of iodine.

24th. The injection has been followed by a smart attack of erysipelas, which has extended down some distance below the knee, and there is considerable constitutional disturbance.

Sept. 1. The erysipelas gradually subsided, but seems to have been of great service, as it has caused union of the walls of the abscess all around the thigh, and the small opening in the cicatrix is nearly closed, discharging a very few drops of healthy pus. The limb is still in the extending splint; but on removing it there seemed no tendency to retraction of the limb. The splint was re-applied; but the body was left free from the bandage, so as to allow of flexion in order to prevent anchylosis.

I might here mention, that for some weeks past, since about the 1st of August, at each dressing her body has been brought at a right angle with the thighs, having this object in view; and I have now permitted her to do it as often as she likes.

Nov. 1. I had not seen the case for two months until to-day, when, to my astonishment, I found her walking on her crutches, which she has been able to do for some two weeks. Her limb appears the same length as the other, and she can flex and rotate it freely. I directed her to bear no weight upon it yet.

20th. To-day I placed her in the horizontal position, and measured her carefully, and find there is about one-eighth or nearly one-fourth of an inch shortening. By taking hold of the foot, the whole body can be drawn down in bed without pain in the joint, and a pressure may be made sufficiently strong to move the pelvis and body upward without producing any shortening of the limb. When she lies upon the back, with the leg extended upon the thigh, she can elevate the heel sixteen inches from the bed, and flex the knee

¹ Since making this note, my impressions have been more confirmed, as two similar pieces of bone have been removed from different parts of the cicatrix, and have thus materially retarded the progress of the case; I should therefore advise great care, after the performance of this operation, that all debris and foreign bodies be carefully washed from the wound; and in so large and ragged an abscess as this one was, it will require more care than any one would imagine, unless they had seen it.

so as to bring the thigh at a right angle with the pelvis; she can rotate it internally so as to touch the other foot, and externally so as to touch the bed. Her general health is perfect, and the case has terminated perfectly successfully. I feel in duty bound to express, in this place, my warmest thanks to Dr. Throekmorton, for his constant care and attention of this interesting case, and to which I am confident I am greatly indebted for so successful a result, as the distance from my house rendered it impossible for me to give it the care required.

The bone was carefully examined, microscopically, but no trace of tubercle was found.

It is now nearly seven years since this operation was performed, and the patient is as large, active, and robust as most of young ladies of her age; can dance, waltz, and run as actively as any of her playmates, and about two months since was presented at a meeting of the Surgical Section of the N. Y. Academy of Medicine, held at Dr. Jas. R's. Woods, and was there examined critically, when all of the motions of the limb were found perfect, even to flexion, which was so complete that she could bring her knee almost to her chin, and she could run up and down stairs with as much ease and rapidity as any other person.

Case of Morbus Coxarius of more than three years' standing—perforation of acetabulum—external abscesses—operation resorted to merely as a palliative measure to relieve pain—perfect relief afforded—death on the 8th day.

Oct. 12, 1859. Raymond, 152 Hicks Street, Brooklyn, aged 11; has hip-disease of four years' standing; emaciated to the greatest possible degree; pulse 140 to 160, and has been so some weeks. A large open abscess over the right trochanter major of the right side, two on the inside of the thigh about four inches below Poupert's ligament, and one on the outside, about five inches below the great trochanter. An inflamed slough over both tuber-ischii, and another at the end of the coccyx. The thigh was flexed strongly on the pelvis, and the pelvis much twisted, so that the limb appeared nearly three inches shorter than the other. The general appearance of the boy's position was very similar to J. C., only more abducted. (See Fig. 7, p. 502.) The diagnosis was hip-disease in the third stage, and far advanced; and I feared the acetabulum had become perforated, but, upon examination per rectum, I could not feel the

head of the bone rotate, as we can do usually when the base of the acetabulum is broken away. Neither could I feel the smooth *flat surface* of the plane of the ilium, which is opposite the acetabulum; but there was a large, round, firm tumor projecting inwards towards the opposite side, and nearly half filling the pelvis, making quite a bulging projection into the side of the rectum, and which eventually proved to be an immense abscess connecting with the perforated acetabulum; the pus was retained between the bones of the ilium, ischium, and pubis, and the periosteum of these bones, which had been peeled off from them and carried inward, and in this manner formed the bulging mass I felt, and which prevented me from feeling either the *flat surface* of the ilium or the head of the femur through its perforation. I ought, however, to have made out the case as abscess behind the internal periosteum, and then I would not have operated; but I did not, and I have thus minutely detailed the case, in order that others may not commit the same error. Had I made an accurate diagnosis of this abscess, it is probable that the better treatment would have been to have punctured it through the rectum, as I would thereby have secured the same relief that I obtained by a much more formidable operation. Drs. Parker, Hossack, and Cockroft saw the child with me, and we all considered it a hopeless case for operation at the time; but consented to perform it if he could be rallied a little, and recommended *nutritious and stimulating diet*. (It is but proper here to state that he had never had a physician to see him before, and that the disease had never been diagnosticated, or even suspected until that time. He had been under the constant care of a celebrated homœopath, who treated him for neuralgia of the hip, but no physician had seen him until our visit. And I make this statement in justice to the profession.)

The following day the father called on me and begged me to perform the operation at once, as he had now a correct idea of the condition of his child, and feared that he would not improve until the cause of the difficulty was removed. But as he had eaten *no meat* or any other substantial diet for nearly four years, I positively refused, as I did not think he could live through the operation.

He continued to importune me daily in this way, and, as the child's sufferings were so intense and agonizing, I finally consented to perform the operation of exscision, not with any prospect of successful recovery, but merely as a means of relief to his suffering, and that he might have some comfort during the few remaining

days of his life. And on the 20th October, 1859, assisted by Drs. Cockroft, Miner, and E. Lee Jones of New York, and Dr. Bauer, of Brooklyn, I proceeded to exsect the hip-joint. The boy was placed fully under the influence of chloroform (Squib's) by Dr. Jones, and then removed from his bed to the operating table in another room; and by a straight ineision over the trochanter, and up on the dorsum of the ilium, in a line with the shaft of the femur when straight, I came at once down to the bone through the periosteum, and, finding the capsular ligament ruptured, disarticulated the head of the femur, and sawed it off just below the trochanter major. On removing the head of the femur from the acetabulum, a large amount of very offensive pus gushed out, and we discovered that the acetabulum was perforated by a large irregularly oval opening an inch in diameter, and into which the irregular shaped head of the femur fitted like a bung in a barrel, and from which pus flowed freely, and was much increased at every inspiration and when coughing. The finger passed in at this opening glided down on the plane of the ischium to the tuberosity, back on the inner cavity of the ilium for nearly an inch, and forward on the body of the pubis to nearly the symphysis; this whole extent of bone was denuded of its periosteum, which was not destroyed, but had been separated from the bones and pushed inwards, and formed the inner wall of the abscess, which was contained between the periosteum and the bone; and on which account I had not been able to feel the head of the femur, in my examination at the time I suspected the perforation as above stated. The father now told us that he fell out of bed about six months previous, and struck upon the trochanter, and since that time his leg had been in exactly the same position as we first found it, and more abducted and fixed than it was previous to the fall. It is therefore probable that the head of the femur was thus forcibly pushed through the acetabulum, and the periosteum not ruptured but separated from the bone, thus making a pocket for the retention of matter. And in order that it might have a free escape, I therefore with strong forceps divided the ilium and ischium at the outer border of the acetabulum, and ischium and pubis at the inner, and cut out the entire plane of the ischium almost to the tuberosity; it was entirely denuded of periosteum on both sides, and only had attachment at the insertion of the ligaments. I also removed the upper and outer border of the acetabulum, and almost the entire body of the pelvis.

The internal layer of periosteum was not wounded at all, so that no communication was made with the peritoneal cavity whatever; but the periosteum which had been peeled off from the inner wall of the pelvis, and was bagged inwards by the pus retained between it and the bones, now fell down to its natural level, and was the only partition between the intestines and the external world.

The operation was necessarily tedious, occupying nearly twenty minutes; but he suffered no pain whatever, being under the constant use of chloroform, and he did not lose more than an ounce of blood. No vessels required ligature, the wound was filled with dry lint, and the patient removed to his bed. In a short time he waked up, and anxiously inquired if I would not oblige him by performing the operation before I left, and was quite delighted and astonished to find it already accomplished. A cup of strong beef broth with brandy and eight drops of morphine was administered, with instructions to repeat every four hours if he was awake, and if he slept to omit the morphine, but not the others.

21st. Pulse 120; skin soft; no pain; a good night's sleep, better than he has had for eight months; eats well, and very comfortable; countenance much improved.

22d. Pulse 112; otherwise same as yesterday, but very weak, although the suppuration is not so great as before the operation.

He continued in this condition of comparative comfort; but gradually growing weaker, died on the eighth day after the operation from exhaustion.

Post-mortem examination revealed caries of almost the entire ilium of that side, which was denuded of its periosteum on both its external and internal surface. The periosteum was peeled from its inner wall entirely, but was not perforated, so that no pus was found within the peritoneum, and although he had this extensive pelvic abscess, yet it did not connect with any of the pelvic viscera. He had tubercles in the lungs and also in the kidneys, the latter organs having partially undergone the fatty degeneration. Even in this case, although tubercle was found abundantly in the lungs and kidney, yet no tubercle was found in the diseased bone by the most careful examination. The emaciation in this case was so excessive, that we measured the height and weight of the body; height four feet nine inches, and weighed only forty pounds.

REMARKS.

The history of exsection of the head of the femur in hip-joint disease lies within the present century. The first surgeon who suggested the possibility of exsection of this bone was Mr. Charles White, in 1769; but the first to attempt its performance in morbus coxarius seems to have been Schmalz, in 1817. In this case the head of the bone was found loose, and simply required removal; the cases of Schlitching,¹ Hoffman, Batchelder, and Klinger, are similar to that of Schmalz.

In 1818, Anthony White performed his celebrated operation, which has generally been referred to as the first successful attempt to exsect the head of the femur in morbus coxarius. It seems to have been repeated but by two surgeons, until the year 1845, viz., Hewson, of Dublin, in 1828, and Textor, Sr., who operated four times, once in 1834, once in 1838, and again in 1839, all terminating unsuccessfully. Textor operated again in 1845, which was perfectly successful, the man obtaining his living afterwards as a peddler. Mr. Fergusson has operated five times, and with uniform success; one patient died two years after the operation "of enlargement of the liver, after having experienced great relief from the proceeding." Mr. Fergusson states (*Med.-Chir. Trans.*, vol. xxviii.) that he has learned that Mr. Brodie performed this operation, and "the patient died within a few days after, the direct effect of that proceeding;" but Mr. Henry Smith, writing in 1848 (*Lond. Lancet*), remarks that he has not been able to "obtain any accurate information respecting the correctness of this assertion." There is no doubt, however, that this surgeon did exsect the femur at St. George's Hospital about the year 1836, but under what circumstances and with what result, I have been unable to ascertain. Carmichael, of Dublin, has been supposed to have performed this operation in 1820; but it is more than probable that the case has been confounded with an exarticulation for medullary sarcoma which he made at that time.

In this country this operation seems to have attracted but little attention until I published my first case in the *New York Journ. Med.* for Jan. 1855, and which is condensed in this report (No. 38). This was the first successful case operated upon in this country, and I

¹ Schlitching's case was one of exfoliation, and not of exsection, and is the first case of this description ever reported, as far as I can discover. It occurred in 1720. (See *Philosophical Transactions* for 1742.)

thought at the time, the first time the operation had been performed here; but I afterwards learned that Dr. Bigelow, of Boston, had performed it a year before, but had not published the case. Dr. Bigelow's case terminated fatally on the twelfth day; mine is therefore the first successful case recorded in this country. Since that time the subject has attracted a great deal of attention, and the operation has been performed seventeen times: by Dr. Baucr 9, Markoe 2, Church 2, Carnochan 1, A. B. Mott 1, Hewson 1, Kinlock 1, and I have performed it twice since. It may have been performed by other surgeons, but I have been unable to obtain any evidence of it.¹

A case is reported in the *N. Y. Med. Surg. Rep.*, Jan. 10, 1846, in which Dr. S. P. Batchelder, of this city, removed the head of the femur in 1845, under the following circumstances: A young man was kicked by a horse upon his hip four or five years before, which gave rise to severe symptoms; fistulous openings formed and discharged pus freely; the probe finally detected dead bone; the fistula was *dilated with sponge tents*, and the dead bone picked out with forceps, which proved to be the head of the femur; the patient now rapidly improved and eventually recovered. This could not be called a case of exsection, and I have therefore not included it in my tables.

I have heard that Dr. Parkman, of Boston, exsected this bone in 1853, but have been unable to obtain any particulars of the case.

By a careful examination of the accompanying table, I think the propriety of the operation will be admitted. We might maintain its importance also, from the fact that it is but following the indications of nature.

The cases of Kluge, Batchelder, Vogle, Selitching, and Harris, in which the head of the femur was found separated from the shaft, are examples of natural efforts to remove the foreign body. Two striking instances of this kind were reported to the *Dublin Pathological Society*, in 1839, by Dr. Carlile, who exhibited two specimens of the epiphysis of the femur, which had been spontaneously discharged in two cases of hip-disease. One patient was twenty years of age, the other five; both rapidly and completely recovered.

In preparing the following table, regard was had to exsection in morbus coxarius only, as it is in reference to this particular class

¹ Nov. 24th, 1860. Since this report was written, I have exsected the head of the femur for morbus coxarius in two cases, both of which were successful; one of the patients, after the wound had completely healed, died of dysentery; the other is now going around with a useful limb, and almost perfect motion in the joint.

of cases that we wished to estimate the value of the operation. I have, however, collected all the cases of exsection that I could find for gunshot wounds, and arranged them in another table, amounting in all to twelve cases, of which eleven died, and only *one* recovered; thus showing a much greater fatality in operations for recent injuries than where it is done for chronic disease. In the one case, the operation more nearly resembles a wound of a *healthy joint*, and consequently is attended with the same dangerous consequences; whereas in the other instance, the parts have lost all the characteristics of a joint, and are in fact nothing more than a bone abscess, and an incision or exsection is attended by no constitutional disturbance; but on the contrary has invariably given great relief to the constitutional symptoms, even if the case did not eventually terminate successfully. I wish to acknowledge my obligations to my friend Dr. Voss, for valuable assistance in preparing the following tables, in giving me the translations from the German literature on the subject.

It will also be observed by a reference to the tables, that the cases which have been operated upon for an acute disease, and of but short duration, have been more fatal than when the disease has been of long standing, and a lower grade of inflammation. (See Cases 98, 107, 108, and 63.

To arrive at the most satisfactory conclusion in regard to the propriety of this operation for *Morbus Coxarius*, each case ought to be separately examined, and all the complications duly considered. And even in cases where the disease has so far progressed that we have no prospect of a successful result, the question arises whether we ought not to perform it *merely* as a *palliative* procedure, in order to prolong their life, and render their lingering days more comfortable by giving a relief to pain, as in the cases (63 and 94) where there was no hope of recovery, the acetabulum being perforated, and the ilium much diseased; and yet the ease and comfort given to the patients by the operation in each case fully justified its performance even as a palliative measure.

By a careful examination of all the fatal cases, and the cause of death as far as given, I have been unable to trace a single instance in which the operation could be ascribed as a cause of death.

Hewson's Case.—Died three months after the operation; profuse suppuration; extensive disease of the cotyloid cavity, with perforation of the acetabulum, and abscesses in the pelvic cavity.

Textor's First Case.—Died on the twenty-third day, from excessive suppuration.

Textor's Second Case.—Gangrene of the wound took place, and the patient died on the fourth day.

Textor's Third Case.—Died on the fifty-third day after the operation from extensive sloughing of bed-sores on the sacrum: on examination, the wound was found nearly cicatrized; there was the commencement of a false joint, consisting in bony deposits on the femur, and a depression of the ilium.

Smith's Case.—Died in four and half months, with Bright's disease of the kidney, and caries of the vertebræ, but his pain was greatly relieved, and his symptoms improved after the operation.

Fergusson's Case.—Died after two years of enlargement of the liver; wound never entirely healed owing to a piece of *necrosed bone* from the edge of the acetabulum, which the *trochanter major* prevented from escaping. The operator remarks: "I left the trochanter, being under the impression that by taking away the diseased head of the femur only, I lessened the danger; but it was found in the after-treatment that the trochanter major so projected outward in the line of incision as greatly to retard the closing of the wound, and I had no doubt, on inspection after death, that it had acted as a kind of cap to the acetabulum, and prevented the necrosed portion of the bone, above referred to, from getting out."¹

Roux's Case.—Died on the seventh day from secondary hemorrhage, the rough section of the femur producing slough of the femoral artery. *Post-mortem* revealed a large collection of pus between the glutei muscles; extensive disease of the cotyloid cavity, and of the femur below its section; pus in the medullary cavity, and disease of the pelvic bones; thus proving the necessity of an earlier operation, and also showing the importance of carefully applied splints and extension after the operation, by which means the perforation of the artery might have been obviated.

Sayle's Case.—Wound healed; but abscess formed subsequently, and did not progress favorably; particulars not given, but it is probable there was diseased bone left.

Watson's Case.—Particulars not given.

Hawkins's Case.—Died on the third day; although his patient was very much exhausted, she suffered but very little from the operation, and was much relieved and improved for two days.

On *post-mortem examination* the acetabulum was found perforated

¹ We do not learn that he used any extension—if so, this should not have occurred.

so as readily to admit the passage of the finger, and pus was in the pelvic cavity.

Erichsen's Case.—We have not full particulars; all the author says is “rapid improvement; suppuration became profuse; died some months after.”

Bigelow's Case.—Died on the twelfth day; acetabulum perforated one-quarter to one-half an inch in extent, and extensive caries remaining.

Bauer's First Case.—Died eighteen months after the operation of convulsions. The wound nearly healed, and had been much improved by the operation.

Bauer's Second Fatal Case.—Died after twelve months of *croup*; the wound having done well.

Bauer's Third Case.—Died of uræmia and convulsions twelve months after the operation.

Bauer's Fourth Case.—Died in four months from inanition and exhaustion, the caries still progressing. In both of these last cases the operation was not performed with any prospect of a successful termination, but simply to afford relief from suffering, and make the patients more comfortable; and the result in both instances was so perfectly satisfactory in this respect as to fully justify the operation in each instance. I saw these cases before and after the operation, and therefore feel authorized to make this remark.

Kinlock's Case.—Died in thirty hours; no particulars given. This is the shortest time of any.

Holston's Case.—Died in seven days; but we must recollect this was the most extensive removal of bone, taking away a large portion of the ilium, ischium, and pubis; and the suppuration was very profuse previous to the operation, and the patient much prostrated.

Markoe's Case.—Died in thirteen days; perforation of the acetabulum; purulent infiltration of the whole upper part of the thigh, and pus in the femoral vein. Had this case been operated upon at the proper time, I have no doubt it would have been as successful as his first case.

Keuchler's Case.—Died of acute *tubercular meningitis* six months after, the wound having healed entirely, and the patient was able to elevate the limb.

My Second Case.—Died on the eighth day, having been infinitely more comfortable during those seven days than he had been for months. Had not a single paroxysm of nocturnal pain, which

formerly and for months had given him such torture; but slept well all night, and ate more food in one day than he had done before in several.

In this case I performed the operation merely as a palliative, with not the slightest hope of success; and the satisfaction of seeing the little fellow's *smiling face* during the few days he lived, when compared with his agonized expression previous to the operation, more than compensated me for its performance.

Church's Case.—Which was another hopeless one, having existed eleven years, was followed by immediate relief of all his painful symptoms; appetite improved, and he slept comfortably without anodynes. In fact, he improved so much that I began to think there was a slight chance that he might possibly recover, when erysipelas and fever began to appear at the hospital, and he gradually sunk and died at the end of three months. On post-mortem examination, the ilium was found extensively carious; acetabulum perforated, and broken in three pieces. *Femur rounded off by efforts of nature, and attached to a small healthy portion of the acetabulum by fibrous tissue.* An abscess in the pelvis connected with the fissure in the acetabulum, and extended to the sacro-iliac junction, which was carious.

Simon's Case.—Was one of advanced phthisis.

Stanley's Case.—Had severe cough and expectoration, and died in a few months of phthisis.

Esmarch's Case.—Died on ninth day, of pyemia.

Langenbeck's Case.—On the eighth day, of phlebitis and metastatic abscess.

Fock's First Case.—On thirteenth day, of pyemia.

Fock's Second Case.—In eleven weeks, of Bright's disease.

Fock's Third Case.—Died on fourteenth day, of phlebitis and metastatic abscess.

Hancock's Case.—Did well for eight days, when erysipelas supervened, of which she died.

Kuhn's Case.—Died on the sixth day; but the caries involved also the sacrum and ischium.

It will be seen that, as far as the particulars of these fatal cases are given, death was attributable in most instances to some grave complication. The operation almost invariably produced the most favorable change in the general symptoms of the patient, and, in several of the fatal cases, the parts involved in the operation have

healed in the most satisfactory manner, when at length the patient has succumbed to some new and acute disease.

By a careful examination of the tabulated cases, the propriety of the operation must be admitted, and also the great importance of not neglecting it too long, lest the constitution become so exhausted as not to rally from the shock, or sink from excessive suppuration. By too long delay also, the acetabulum may become so much involved as to render the operation useless, although in two of the successful cases the acetabulum was found to be perforated. I cannot but think, after a careful study of all the fatal cases that I have reported, that, had the plan proposed been earlier adopted, we might have anticipated a more favorable result, at least in some of them.

In *Braithwaite's Retrospect* (Part XIX., page 119), Mr. Syme, in concluding some remarks on hip-disease, says: "The result depends chiefly upon the state of the bones composing the joint. If they are carious, he *must* die; if they are not, he *may* recover." The Italics are his own. And then goes on to censure any operative interference in the following language.

"Some operations have lately been performed in London, with the view of remedying caries of the hip-joint, by cutting out the head of the thigh-bone; but this proceeding must have originated and been conducted in forgetfulness of the well-established pathological fact, that when caries attacks the surface of a joint, it is never limited to one of the bones which compose the articulation. If the articulating surface of the head of the thigh be carious, it follows as a matter of absolute certainty that the acetabulum must be in a similar condition. But as the acetabulum does not admit of a removal in the living body with any prospect of safety or advantage, no benefit can be derived from taking away a part of the articulation, and, therefore, *excision* of the *head* of the thigh-bone for caries of the joint should be regarded as *no less erroneous in theory than objectionable in practice.*"

Having once himself successfully removed the head of the humerus for disease of the shoulder joint, and fearing that his own case might be quoted in opposition to the principle he was then anxious to establish, he refers to it in the following language. "In an old volume of *The Lancet*, it is stated that Mr. Syme cut out the head of the humerus for disease of the shoulder-joint, leaving the glenoid cavity to 'shift for itself,' the fact really being that the patient labored under necrosis of the upper end of the bone, so that

the head was expanded into a thin shell containing an exfoliation, which was removed with the effect of preventing amputation at the shoulder-joint previously deemed requisite, and enabling the subject of the case, then a boy, to grow up into a strong and healthy man. This statement, like many others, having no foundation except in the depraved imagination of their authors, was treated with the silence that it deserved, and would not be noticed now unless there seemed a risk of its being stumbled on by some one in search of authorities for bad practice;" and even as late as 1855 (see *Braithwaite*, Part XXXI., p. 117), in speaking of "*Sinuses of the Hip depending upon exfoliation from the Pelvis*," he says: "Sinuses about the pelvis are unhappily met with very frequently as the attendants or consequences of disease in the hip-joint, when the disease being of an *incurable* kind, and the part concerned *not admitting of removal*, any sort of treatment can produce no better effect than a very imperfect degree of palliation, and it has hence been usual to regard such cases as of a very hopeless character."

In order, therefore, to justify myself against so high an authority as Mr. Syme, and to sustain the principles which I have endeavored to establish in this report, I have taken the trouble to collect all the cases of exsection of this joint which I could find, and arrange them in a tabulated form, and in chronological order, for easy reference. I feel quite confident that, by a careful study of these cases from the various authors to whom I have referred, even Mr. Syme will modify, if not entirely change, his previously expressed opinion.

Tables of Exsection of

No.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
1	M.	6	One year.	Caries; head separated from shaft.	. . . . .
2	M.	14	Fall three years before.	Head dislocated on dorsum; great exhaustion; several fistulæ.	Straight incision; straight saw; 4 inches removed.
3	M.	..	. . . . .	Caries.	Removed above lesser trochanter.
4	M.	7½	Fract. of femur and pelvis.	Caries.	. . . . .
5	M.	22	. . . . .	Caries; head dislocated.	. . . . .
6	M.	54	. . . . .	Disease of neck of bone and trochanter; head healthy.	Removed head, neck, and trochanter major.
7	M.	7	Caries.	Caries.	Removed all above lesser trochanter.
8	M.	15	Some months.	Head dislocated on dorsum ilii; large sinuses extending to it.	Straight incision; chain saw broke; used the straight; 4 inches removed.
9	M.	8	Some months' standing.	Head dislocated; abscess over the ilium; sinuses; hectic and emaciation.	Cruical incision; edges of acetabulum removed; left the trochanters.
10	M.	15	Long standing.	Dislocation; emaciation; cough; hectic; no abscess or fistulæ.	Straight incision; removed head and part of neck.
11	M.	18	Long standing.	Anchylolysis.	. . . . .
12	M.	20	. . . . .	Limb had been ankylosed, but had given way; acetabulum filled with pus and fragments of bone.	Resected in 1848.

¹ This case of Mr. White's died some five years after, some authors have erroneously stated twelve years after the operation; but Mr. South, in giving an account of this case (*Chelius' Surgery*, vol. ii. p. 980) gives the true date of his death as five years subsequent to the operation. The ilium and the remains of the femur were found thin and light. The thigh-bone rested with its upper extremity against the hinder part of the acetabulum, and was united to it and to the neighboring portion of the

Hip-Joint for Caries.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
1	Recovered.	1817	Schmalz	Hedonus, Comment. Chir., Leipsic, 1823.
2	Bandages and splints used as in compound fractures; fever slight; discharges soon ceased; health rapidly improved; well in a year; perfect use of limb, except in rotating knee in.	1818	A. White. ¹	Cooper's Surgical Dictionary.
3	Perforation of acetabulum, and formation of abscess in the pelvis; died in 3 mo's.	1828	Hewson (in Dublin).	
4	Died on 23d day, of excessive suppuration.	1834	Textor, Sen.	Inaug. Dissert. Wurtzburg, 1834.
5	Gangrene of wound took place, and death followed on the 4th day.	1838	Textor, Son.	Oppenheimer's Inaug. Dissert. on Resection of Hip-Joint, Wurtzburg, 1840.
6	Sloughs formed on the sacrum; death on 53d day; wound nearly healed; from the small trochanter, new bone was formed over the upper third of femur, the cut surface of which had become rounded off; the acetabulum, which was covered by granulations, was healthy; at separate points in it were found deposits of new bone; the upper end of femur rested on ischium; at posterior edge of acetabulum, a depression had been formed in this bone $1\frac{1}{2}$ inch long, $\frac{1}{2}$ inch broad, 2 lines deep.	1839	Textor, Sen.	Ibid.
7	Recovered, with good limb; obtains his living as a peddler.	1845	Textor, Sen.	Dircks de resectione capitis femoris, Wurtzburg 1845.
8	Dressed as in compound fracture; shock slight; wound healed well; health rapidly improved; limb very useful, $2\frac{1}{2}$ inches shorter than the other.	1845	Fergusson.	Med.-Chirurg. Trans., vol. xxviii.
9	Treated as in former case; health improved; wound never entirely healed; died 2 years after of disease of the liver.	1847	Fergusson.	Fergusson, Pract. Surgery, Lond. ed., 1852, p. 473.
10	Secondary hemorrhage; collection of pus between the glutei muscles; death on 7th day; extensive disease of cotyloid cavity.	1847	Roux.	Gazette des Hôpitaux, No. 28, 1847.
11	Recovered, with partial usefulness.	1847	Maisonneuve	
12	Sixteen months after amputation was performed; died $2\frac{1}{2}$ years after the first operation.	1848	Heyfelder.	Heyfelder on Resections and Amputations, Bonn, 1855.

os illi by a firm ligamentous tissue, which appeared to belong partly to the remains of the articular capsule, which had been left between the bones. A muscle was inserted into this tissue, and into the upper portion of the femur. (See Catalogue of the Pathological Specimens contained in the Museum of the Royal College of Surgeons of England, London, 1847, vol. iii. page 230.)

Tables of Exsection of

No.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
13	M.	33	Disease; eighteen months.	Hip swollen; sinus discharging; caries.	Straight incision; removed three inches of rim of acetabulum; no ligatures.
14	..	child	Two years.	Head dislocated on dorsum ilii; sinuses and abscesses.	Removed head and portions of acetabulum.
15	F.	10	Disease; some time.	Head carious, and dislocated on dorsum.	Head and trochanter removed; acetabulum healthy.
16	F.	not g'vn	. . . . .	Caries.	Removed head.
17	M.	16	Two years' standing.	Caries; severe pain; sinuses with discharge.	Straight incision; removed four inches, and the carious part of cavity.
18	M.	..	. . . . .	Caries.	. . . . .
19	M.	..	. . . . .	. . . . .	. . . . .
20	M.	8	. . . . .	Caries.	Removed head.
21	F.	12	. . . . .	Large open sore on hip; caries; sinuses; emaciation, etc.	Straight incision; common saw; removed four and a half inches.
22	F.	..	Three years.	Caries; head dislocated.	Crucial incision; removed head and trochanter major.
23	..	18	. . . . .	Caries.	. . . . .
24	M.	41	Two years.	Great suffering; grating in joint; large discharge of matter.	Made a T incision; capsule entire, except at inner edge; removed below great trochanter; head carious, edge of cavity also.
25	..	..	. . . . .	Caries; head and neck partially destroyed.	Removed head.
26	F.	32	. . . . .	. . . . .	Removed head.
27	M.	17	. . . . .	Caries.	. . . . .
28	F.	10	Several years.	Feeble and emaciated; fistulæ discharging freely.	Circular incision; large collection of pus under glutei.
29	F.	10	Four years.	Head carious; emaciation and hectic.	Straight incision; removed one inch below trochanter, also edge of acetabulum.
30	M.	10	. . . . .	Caries.	Removed head.

Hip-Joint for Caries—Continued.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
13	Water dressings; fever slight; symptoms improved for 4 months, when leg became cedematous, and he died 4½ months after the operation; Bright's disease of kidneys, and caries of vertebra found.	1848	Smith.	London Lancet, Nov. 25, 1848.
14	Died 4 days after the operation.	1848	Simon.	London Lancet, April, 1848.
15	Recovered.	1848	French.	London Lancet, 1848.
16	Recovered; good limb.	1848	French.	Fergusson's 3d Lond. edition, p. 435.
17	Dressed as in fracture; pain ceased; health rapidly improved; wound closed well.	1848	Walton.	London Lancet, 1848.
18	Recovered perfectly.	1848	Fergusson.	Ibid.
19	Unsuccessful.	1848	Walton.	
20	Died 23 days after the operation.	1848	Textor, Jr.	Textor on Resection of Head of Femur, Wurtzburg, 1858.
21	Placed in straight position; slight fever; symptoms soon improved; ulcers healed; died after some months.	1849	Cotton.	London Med. Gazette, 1849.
22	Recovered perfectly.	1849	Fergusson.	Fergusson, pp. 473, 475.
23	Recovered, with perfect motion of thigh, and could walk a short distance.	1849	Morris.	Prov. Med. and Surg. Journ., Feb. 6, 1850.
24	Wound cicatrized rapidly; severe symptoms all subsided; died 3 months after of dysentery, the wound being nearly healed; parts found in a healthy condition, and in an advanced stage of repair; acetabulum studded with new bone, and filled with healthy granulations.	1850	Buchanan.	Glasgow Med. Journ., April, 1853, p. 10.
25	Wound healed, but abscess formed; did not progress very favorably.	1851	Sayle.	
26	Recovered perfectly.	1852	Jones.	Med. Times, Nov. 6, 1852.
27	Recovered perfectly.	1852	J. Heusser.	Schweig. M. Zeitschr., 2, 1854.
28	Symptoms rapidly improved; made extensions by weight attached to foot; wound healed.	1852	Stanley.	London Lancet, Feb. 14, 1852.
29	Progressed favorably two days; died on third day after operation; found large perforation of acetabulum.	1852	Hawkins.	London Lancet, Feb. 28, 1852.
30	Successful; could walk in one year; limb shortened 2½ inches.	1852	Reid.	Schillhach, Resection, Jena, 1858, p. 12.

Tables of Exsection of

No.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
31	M.	8	. . . . .	Caries.	. . . . .
32	M.	10	About twelve months.	Caries and complete dislocation; very loose abscess; extensive disease of socket as well as of the thigh-bone.	Bone separated while sawing; crucial incision.
33	..	..	. . . . .	Caries.	. . . . .
34	F.	26	. . . . .	Caries.	. . . . .
35	M.	14	. . . . .	Greatly reduced; bone dislocated.	Neck and great trochanter removed.
36	F.	12	Long standing.	Caries and necrosis.	Removed head and both trochanters.
37	M.	8	Long standing.	Great emaciation; hectic; caries.	Removed head and edges of acetabulum.
38	M.	23	. . . . .	Caries.	. . . . .
39	F.	9	Eighteen mo's.	Great emaciation; hectic; extensive caries.	Removed head and edges of acetabulum.
40	M.	26	. . . . .	Caries.	Resected.
41	M.	11	. . . . .	Caries; involving, also, sacrum and ischium.	Resected.
42	M.	3½	Fall months before on hip.	Caries.	Removed head, neck, and part of large trochanter, and gouged acetabulum thoroughly.
43	M.	10	Fall on hip 3 mo's before.	Caries.	. . . . .
44	M.	4	. . . . .	Extensive caries.	Removed head, neck, large trochanter, and part of small, and part of acetabulum.
45	F.	14	. . . . .	Caries.	. . . . .
46	M.	10	. . . . .	Caries.	. . . . .
47	M.	20	. . . . .	Caries.	. . . . .
48	M.	14	. . . . .	Caries.	. . . . .
49	M.	17	. . . . .	Caries; luxation spontaneous. (?)	. . . . .
50	M.	6	. . . . .	Caries.	. . . . .

Hip-Joint for Caries—Continued.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
31	Successful; walked with crutches in 18 months; patient strong and healthy.	1852	Stanley.	London Lancet, 1854, vol. i. p. 61.
32	Cold water dressings; pulse unaltered three days; death on twelfth day; one-third of neck of femur remained; perforation of acetabulum one-quarter to one-half inch in extent; below this, bone eaten in appearance.	1853, Feb. 21	Bigelow.	Surg. Records of Massachusetts General Hospital, vol. li. p. 18.
33	Perfect recovery.	1853	Parkman.	Ibid.
34	Perfect recovery.	1853	Jones.	
35	Rapid improvement; suppuration profuse; died some months after.	1853	Erichsen.	
36	Recovered.	1854	Fergusson.	London Lancet, 1854.
37	Recovered.	1854	Erichsen.	
38	Died.	1854	Textor, Sen.	Textor on Resection of Head of Femur, 1858.
39	Recovered perfectly, with half inch shortening; has now, seven years after the operation, perfect use of the limb, can dance, and run up or down stairs, with as much ease and freedom as any child of her age.	1854, Mar. 29	Sayre.	New York Journal of Medicine, Jan. 1855.
40	Recovered, and died three years after of phthisis.	1854	Esmarch.	Stromeyer, Maxims of Military Surgery, p. 714.
41	Died on sixth day.	1854	Kuhn.	Gunther's Tables, No. 23.
42	Recovered, with two inches shortening, and articulation.	1854	Bauer.	Operator.
43	Recovered; walked without crutches.	1855	Roser.	Verbal communication to Textor.
44	Died eighteen months after of convulsions.	1855	Bauer.	Operator.
45	Recovered, with useful limb.	1856	Shaw.	
46	Died one month after.	1856	Textor, Jr.	
47	Died thirty hours after.	1856	Kinlock.	Charleston Journal, May, 1857.
48	Recovered; useful limb.	1856	Hancock.	
49	Recovered, with perfect usefulness of limb.	1856	Morgan.	
50	Recovered perfectly, with useful limb.	1856	Erichsen.	

Tables of Exsection of

No.	SEX.	AGE	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
51	M.	13	. . . . .	Caries.	. . . . .
52	M.	5	. . . . .	Caries.	. . . . .
53	M.	3	Can so not trace- able; caries of 2 y'rs stand'g.	Caries; emaciation; five fistulous openings.	Removed part of head and neck, and part of acetabulum.
54	F.	7	Periostitis, ter- minating in caries of neck, and external perforation of capsulo.	Caries of neck of femur; perforation of acetabu- lum.	Removed head and neck.
55	F.	8	. . . . .	Caries, with hectic fever and suppuration.	Crescent incision; removed head of femur below trochanter; neck fractured in attempt to disartic- ulate; acetabulum gouged.
56	M.	10	. . . . .	Caries, and profuse sup- puration.	Removed upper third of femur and gouged acetabulum, which was perforated so that two fingers could be introduced.
57	M.	17	Rheumatic in- flammation of right hip, with suppuration.	. . . . .	Resected, Feb. 1856.
58	F.	9	Diastasis, and 'subsequent ca- ries.	Caries.	Removed a portion of neck; the head had been discharged through an opening in the anterior part of the capsule, and was found in the muscles on anterior of the thigh.
59	M.	10	. . . . .	Caries.	. . . . .
60	M.	8	. . . . .	Caries.	. . . . .
61	M.	11	. . . . .	Caries.	. . . . .
62	M.	16	Two years.	Luxation in ischiatic crotch.	Resected, Dec. 21, 1857.
63	M.	6	Fall some mo's previous.	Extensive caries and per- foration of acetabulum.	As a palliative operation, removed head and neck, gouged acetabu- lum and surrounding bone.
64	M.	7½	Three years.	Caries, luxation, ab- scess, and hectic.	Resection by T incision; sawed through trochanters, and gouged acetabulum.
65	M.	8	Three years.	Caries, abscess, and fis- tulæ; spontaneous lux- ation. (?)	Resected through neck, and ace- tabulum gouged.
66	M.	12	Three years.	Caries; spontaneous lux- ation; fistula.	Resected below trochanter major; gouged acetabulum, June 2, '57.
67	M.	6	Two years.	Caries, abscess, and fis- tula.	Resected through neck; acetabu- lum gouged.

Hip-Joint for Caries—Continued.

NO.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
51	Recovered perfectly; useful limb.	1856	Stanley.	Operator.
52	Recovered; useful limb.	1856	Ure.	
53	Died about twelve months after, from diphtheritic croup.	1856	Bauer.	
54	Died twelve months after, from uræmic convulsions coexisting with general exhaustion.	1856	Bauer.	Operator.
55	Successful; in three years, could walk well and rapidly with high heel, without cane or crutches.	1856	Nussbaum.	Fock's Table.
56	Recovered, with $3\frac{1}{2}$ inches shortening; required mechanical support to walk.	1856	Nussbaum.	Ibid.
57	Successful; walked with crutches in May; in October, could walk three miles with stick; good motion of joint.	1856	Shaw.	London Lancet, vol. ii. p. 430.
58	Recovered; half inch shortening; intermediate substance yet soft, but promises a useful limb.	1857	Bauer.	Operator.
59	Recovered; useful limb.	1857	Hancock.	Lancet, 1857, vol. ii. p. 390.
60	Recovered; useful limb.	1857	Price.	Lancet, 1857, vol. ii. p. 417.
61	Recovered; useful limb.	1857	Bowman.	
62	Recovered in one month.	1857	Holmes Coote	
63	Symptoms immediately relieved, but died four months after from inanition; caries progressive.	1857	Bauer.	Operator.
64	Applied extension; result successful; could walk in six months; cough and hectic cured.	1857	Erichsen.	Lancet, 1857, vol. i. p. 310, and vol. ii. p. 363.
65	Result good; half inch shortening; walked without cane; had motion of joint.	1857	Ure.	Lancet, 1857, vol. i. p. 530, and vol. ii. p. 418.
66	On 5th of July, result was favorable, and patient was free from pain.	1857	R. Cooker & N. Davies.	Lancet, 1857, vol. ii. p. 55.
67	Two months after, nearly healed; walked with high-heel shoe; motion good.	1857	Holt.	Lancet, 1857, vol. ii. pp. 84 and 363.

Tables of Ersection of

NO.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
68	F.	11	. . . . .	Caries far advanced.	Resected below trochanter.
69	M.	..	. . . . .	Caries, abscess, fistula, and advanced phthisis.	Resected in 1857.
70	F.	6	Two years.	Anchylosis of femur at right angle; head destroyed by caries.	Removed head below trochanter; chiselled off edge of acetabulum and pubis.
71	M.	13	. . . . .	Luxation of head; femur on os pubis; hectic fever, with cough.	Resected in 1857.
72	M.	21	Two years.	Fistulous openings on thigh, with extensive femoral abscess; spontaneous luxation. (?)	Resected near trochanter; gouged out carious cavity in trochanter.
73	F.	5	Uncertain.	Caries; abscess; fistulæ; thigh much flexed.	Resected one inch below trochanter; acetabulum chiselled out.
74	F.	10	Four years.	Suppuration, hectic, luxation. (?) and head anchylosed by callus.	Resected through neck near trochanter; removed two sequestra from acetabulum.
75	F.	13	Two years.	Abscess, fistulæ, hectic, and spontaneous luxation. (?)	T incision sawed three and a half inches below trochanter, on Dec. 16, 1857.
76	M.	45	. . . . .	Caries.	. . . . .
77	M.	4½	Traumatic injury, contusion of hip.	Caries of head; no external opening.	Removed head, and gouged upper edge of acetabulum.
78	M.	27	. . . . .	Caries and spontaneous luxation. (?)	. . . . .
79	M.	8	Nine months.	Caries of head, neck, and acetabulum.	September 27, 1858, head removed through upper edge of both trochanters; acetabulum gouged thoroughly.
80	M.	18	Ten months.	Fistulæ, hectic, etc.; head carious; acetabulum nearly perforated.	Dec. 6, 1858, removed through trochanter; head carious; acetabulum, appearing healthy, was not gouged.
81	M.	7	Eighteen mo's.	Extensive caries.	Carious head and neck removed; two points in acetabulum gouged out.
82	F.	26	Twenty years.	Anchylosis, fistula, pelvic abscess, and caries.	Resected below trochanter; most of acetabulum, of the spine, and large portion of tuber ischii resected.

Hip-Joint for Caries—Continued.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
68	Walked with crutches in nine weeks.	1857	Fergusson.	Lancet, 1857, vol. ii. p. 362.
69	Died of phthisis a few days after.	1857	Simon.	Lancet, 1857, vol. ii. p. 390.
70	Result good, but has disease of heart.	1857	Bowman.	Fock's Table, No. 64.
71	Died of phthisis a few months after.	1857	Stanley.	Lancet, 1857, vol. ii. p. 391.
72	Gradual extension; result successful; in two months, walked with crutches.	1857	Dumreicher.	Fock's Table, No. 68.
73	Cured and dismissed in three months.	1857	B. Langenheck.	Fock's Table, No. 69.
74	Died of exhaustion on tenth day.	1857	B. Langenheck.	Fock's Table, No. 70.
75	Was doing well ten days after, when the case was reported.	1857	Hewson.	North American Med.-Chir. Review, March, 1858, p. 325.
76	Recovered, with useful limb.	1858	Bowman.	Nos. 60, 61, and 76, notices reach only to the first month after the operation. Boston Med. Jour., Jan. 1858.
77	Recovered; half inch shortening; useful limb.	1858	Bauer.	Operator.
78	Died seven days after.	1858	C.F. Holston.	
79	Recovered, with useful limb; walked in Feb. 1859, with good motion of joint.	1858	Markoe.	Operator.
80	Died thirteen days after, when the acetabulum was found perforated, purulent infiltration of upper part of thigh, and abscess in femoral vein.	1858, Dec. 6	Markoe.	Operator.
81	Wound healed; could elevate the limb, but died six months after with tubercular meningitis.	1858, May 21	Kühler.	Deutsche Klinik, 1859, No. 40.
82	Doing well for eight days, when erysipelas supervened and patient died.	1858	Hancock.	Lancet, 1858, vol. ii. p. 118.

Tables of Exsection of

No.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
83	F.	13	Sixteen mo's.	Abscesses, fistula, profuse suppuration, and hectic.	Resected below trochanter; head absorbed; removed large mass of carious bone from acetabulum, and also tubor ischii.
84	F.	10	Eighteen w'ks.	Large abscess; another descended to the fibula.	Resected March 3, 1858, near trochanter major; trochanter removed by forceps, also small piece of ilium.
85	M.	54	Two years.	Bed-sores; luxation.	T incision; resected below trochanter minor.
86	M.	16	Several years' standing.	Suppuration, hectic, and caries.	Crescent incision; head luxated against symphysis pubis; sawed below trochanter; acetabulum perforated; removed margin and gouged cavity.
87	M.	21	Fall one year and a half before.	Suppuration; spontaneous luxation; numerous fistulæ; great emaciation.	Removed below trochanter, Nov. 25, 1858.
88	F.	12	. . . . .	. . . . .	. . . . .
89	..	..	. . . . .	Caries.	Head and part of acetabulum removed.
90	..	..	. . . . .	. . . . .	Below the trochanter and half the acetabulum.
91	..	..	. . . . .	. . . . .	. . . . .
92	M.	7	One year.	Abscess.	Head removed.
93	F.	19	One year.	Caries; abscess opened spontaneously in six months.	Straight incision; removed head and neck; ligamentum teres destroyed.
94	M.	8	Four years.	Caries; abscess; emaciation extreme.	Operation performed as a palliative measure only; straight incision; removed head, large portion of ilium, ischium, and pubis; acetabulum perforated.
95	F.	9	Three years.	Abscess from crest of ilium to middle of thigh; crepitation perceptible under chloroform.	Resected, May 13, 1859, by crescent-shaped incision; sawed below trochanter major with chain saw; acetabulum gouged.
96	M.	14	Fall; one year.	Abscess; crepitus.	Resected, June 10, 1859, in neck of femur by chain saw; posterior margin and bottom of acetabulum carious and gouged out.
97	M.	49	Chronic rheumatism.	Crepitation under chloroform; no suppuration.	Resected, Oct. 11, 1859, below trochanter; acetabulum enlarged; head and neck covered with osteophytes around margin. ¹

¹ This case is one of chronic rheumatic arthritis, and hardly belongs to this table of exsection for caries.

Hip-Joint for Caries—Continued.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
83	Left the bed in three and a half months; some fistulous openings, but health gaining and limb straight.	1858	Erichsen.	Lancet, 1858, vol. ii. p. 88.
84	Cured in ten weeks.	1858	Erichsen.	Lancet, 1858, vol. ii. p. 89.
85	Died from exhaustion eleven days after.	1858	Hilton.	Lancet, 1858, vol. ii. p. 116.
86	Nearly well four months after; patient walks with crutches.	1858	Nüssbaum.	Fock's Table, No. 80.
87	In fall of 1859, walked with stick and high-heeled shoe; bas fistula still, but probe does not touch bone.	1858	Esmarch.	Fock's Table, No. 81.
88	Recovered perfectly.	1858	Beaney (Australia).	Original contributions to the Practice of Conservative Surg., 1859.
89	Recovered; good limb.	1859	Price.	London Lancet, Nov. 26, 1859.
90	Recovered.	1859	Price.	Ibid.
91	Recovered perfectly.	1859	Jones.	Ibid.
92	Recovered perfectly.	1859, Oct. 16	Church.	Operator.
93	Recovered; walked without crutches.	1859	F. Van Durnski (Vienna).	
94	Died on the eighth day; for full report of post mortem, see case J. R., embodied in report.	1859, Dec.	Sayre.	Operator.
95	Three months after, only one fistula; used Bonnet's wire breeches; in eight weeks, walked with crutches; now, 1860, walks well all day; one inch shortening.	1859	Fock.	Archive for Clinical Surgery, by Langenbeck, 1860, vol. i. p. 172.
96	Beginning favorable; died in eleven weeks of Bright's disease.	1859	Fock.	Ibid.
97	Walked with crutches ten weeks after operation; heel inch and a half higher than the other.	1859	Fock.	Ibid.

Tables of Exsection of

No.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
98	M.	22	Acute coxitis; four months.	Luxation.	Resected, Sept. 27, 1859; straight incision; head on posterior margin of acetabulum; neck carious; removed at trochanter major.
99	M.	6	Traumatic injury nine mo's previous.	Caries of head and acetabulum; perforation of capsule; external abscess forming.	Removed head and neck; gonged acetabulum superficially in May, 1860.
100 ¹	M.	7	Direct injury of hip three y'rs previous.	Caries of head and acetabulum.	Removed head and neck; gonged acetabulum very thoroughly on the 4th of April, 1860.
101	F.	4	Falls two years previous.	Three fistulous openings; great emaciation.	Resected through the trochanter major, and removed some loose pieces from acetabulum, May 1, 1860.
102	M.	16	Fall on trochanter when a child; but 3 years ago fell in a cistern, and injured the hip seriously, and dates the disease to the last injury.	External abscess, profuse suppuration, and great emaciation; limb shortened nearly three inches; trochanter major high up, and back on ilium; like luxation in ischiatic notch.	Operation in March, 1860; neck entirely absorbed, and trochanter over ischiatic notch, having remains of head of femur still loose in the acetabulum; removed the same and trochanter, with portions of acetabulum, which was perforated.
103	M.	13	A fall.	Caries, with external abscess and fistulæ.	Semilunar incision; arch over trochanter major, and straight incision over trochanter; removed four inches of femur.
104	M.	4	Fall when two years old, producing inflammation of left hip-joint.	Capsule ruptured; extensive femoral abscess; no external opening.	Free incision into abscess; after its evacuation, crepitus was detected, and exsection was immediately performed; head, almost absorbed, was removed, and acetabulum, carious, was thoroughly gougèd.
105	M.	11	Coxitis; two years.	Anchylosis; thigh much flexed; abscess behind trochanter; fistulæ and hectic.	Resected, March 23, 1860, near trochanter; difficulty in removing from joint on account of anchylosis.
106	F.	13	Coxitis; three years.	No suppuration; hectic fever; crepitation under chloroform.	Resected, Jan. 9, 1860; ligamentum teres destroyed; joint full of pus; head partly destroyed; neck and trochanter major carious; removed below trochanter, with chain saw; acetabulum gougèd.
107	F.	13	Acute coxitis; two months.	Abscess; crepitation.	Resected, March 16, 1860; head and neck carious; ligamentum teres destroyed; sawed through trochanter major; cauterized posterior margin of acetabulum with hot iron.

¹ Case 100 had been treated for hip-disease in the second stage two years previous, by puncture and rest, with extension in the wire breeches; recovered perfectly without internal treatment, and discharged. Remained well one year, and was in the country at school. Violent exertion and fall re-

Hip-Joint for Caries—Continued.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
98	Doing well until 10th of October; died of pyæmia.	1859	Fock.	Archivo for Clinical Surgery, by Langenbeck, 1860, vol. i. p. 172.
99	Recovered; three-quarter inch shortening; mobility July 20, 1860.	1860	Bauer.	Operator.
100	Recovered; one and a quarter inch shortening, with motion; commenced walking July, 1860.	1860	Bauer.	Operator.
101	Recovered perfectly, without any untoward symptoms, with free motion, yet not sufficiently firm to bear any weight upon it, August 1st.	1860	A. B. Mott.	Operator.
102	Improved very much after the operation, but died of erysipelas at the end of three months, hospital gangrene having occurred in the ward of the hospital in which he was confined.	1860	W.R.Church.	Operator
103	Perfect recovery, with motion; two and a half inches shortening.	1860	J. M. Carnohan.	Operator
104	Wound healed perfectly in six weeks, with motion; half inch shortening.	1860, July 8	Sayre.	
105	Two months after, femur straight; could move limb in every direction; promises good result.	1860	Rausche.	Fock's Table, No. 93.
106	April, three months after, promising well.	1860	Fock.	Archive for Clinical Surgery, by Langenbeck, 1860, vol. i. p. 172.
107	Died of phlebitis and metastatic abscess in ankle on 14th day.	1860	Fock.	Ibid.

produced the disease, which remained some months without treatment; and, when seen, presented the condition as above described, when I assisted at the operation by request, and have seen the patient in his improved condition.

Tables of Exsection of

NO.	SEX.	AGE.	CAUSE AND DURATION.	CONDITION AT TIME OF OPERATION.	OPERATION.
108	M.	5	Coxitis after measles; nine months.	Suppurative luxation; (?) hectic fever.	Resected, Feb. 13, 1860, below trochanter major.
109	M.	27	Contusion one year before.	Abscess.	Removed head and neck, Jan. 24, 1860.
110	F.	5	Fall eighteen months before.	Great emaciation; three fistulous openings leading to dead bone; deformity very great.	Straight incision; removed head and neck, and part of trochanter major; gouged acetabulum.

Hip-Joint for Caries—Concluded.

No.	PROGRESS OF CASE AND RESULT.	DATE.	OPERATOR.	AUTHORITY.
108	Died of phlebitis and metastatic abscess on 21st of February, eight days.	1860	Langenbeck.	Fock's Table, No. 88.
109	31st Jan., bed-sore; 5th Feb., rigor, and death on 9th of pyæmia.	1860	Esmarch.	Fock's Table, No. 89.
110	Placed in wire breeches, with extension; recovered perfectly in seven weeks; half inch shortening; good motion, and walked with stick in three months (Nov. 27th).	1860, Aug. 4	Sayre.	

RECAPITULATION.

Total number of resections of head of femur for caries	. . . . .	110
Died . . . . .	. . . . .	36
Reported as unfavorable . . . . .	. . . . .	2
Recovered, with more or less useful joint . . . . .	. . . . .	72
		<u>110</u>

Table of Exsection of Head of Femur from Gunshot Wounds.

NO.	SEX.	AGE.	OPERATOR.	YEAR.	RESULT.	AUTHORITY.
1	M.	..	Oppenheim.	1829	Died in 17 days from epidemic plague.	Hamburg Zeitschr., vol. i. page 737.
2	M.	..	Seutin.	1832	Died in 9 days after.	Gazette de Méd. de Paris, 1833.
3	M.	30	Toxtor, Sen.	1847	Died 9 days after from gangrene.	
4	M.	..	Schwartz.	1849, May 13	Died 7 days after of gangrene.	Esmarch on Resection.
5	M.	..	Ross.	1850	Removed loose head of femur from gunshot wound 2 years before.	
6	M.	30	Baum.	1854	Died in 24 hours.	
7	M.	..	Blenkins.	1855	Died in 3 weeks from pyæmia.	
8	M.	..	Macleod.	1855	Died.	
9	M.	..	Crerar.	1855	Died.	
10	M.	..	Hyde.	1855	Died.	
11	M.	..	Combe.	1855	Died.	
12	M.	..	O'Leary.	1855	Recovered after 12 weeks, could walk on crutches; motion.	

RÉSUMÉ.—Total number of exsections of head of femur for gunshot wounds 12; of which 11 died and 1 recovered.

An apology is almost due to the profession for the apparently careless manner in which this paper has been prepared, and the want of method and connected arrangement of many of its parts. But I have written it in broken fragments of time, absolutely stolen from the hours of rest I so much needed to restore a constitution severely shattered by a recent illness of a most dangerous character, caused by a dissecting wound, and this I offer as my only excuse.

I was appointed to make a report, and was therefore compelled to comply as well as my limited time would allow. If I have thrown any new light upon the subject, or shall have been the means of exciting to its investigation other more competent minds in the profession, who will develop any new method for the more perfect relief of these heretofore almost hopeless cases, I shall be more than compensated for the time and labor I have had in preparing it.

